DOCUMENT RESUME

ED 357 915 RC 019 144

TITLE	Wilderness Medicine Newsletter, 1992.
INSTITUTION	Wilderness Medicine Newsletter, Inc., Bel Air, MD.
REPORT NO	ISSN-1059-6518
PUB DATE	92
NOTE	78p.
PUB TYPE	Collected Works - Serials (022)
JOURNAL CIT	Wilderness Medicine Newsletter; v3 n1-6 Jan-Dec 1992
EDRS PRICE	MF01/PC04 Plus Postage.
DESCRIPTORS	*Accident Prevention; *Diseases; *First Aid; *Injuries; *Medical Services; Medicine; *Outdoor Activities; Outdoor Education; Program Descriptions
IDENTIFIERS	Risk Management; *Wilderness Education

ABSTRACT

This document consists of the six issues of "Wilderness Medicine Newsletter" published in 1992. This journal, subtitled "For the recognition, treatment, and prevention of wilderness emergencies," includes feature articles, book reviews, product reviews, letters to the editor, notices of upcoming wilderness conferences, and general information relevant to medical services and outdoor activities. Feature articles discuss issues such as the effect on outdoor programing of new Occupational Safety and Health Administration (OSHA) standards concerning guidelines for Hepatitis B vaccinations; the importance of obtaining medical histories from participants in outdoor programs; recommendations for prescription and nonprescription drugs to include in a wilderness first aid kit; descriptions of wilderness risk management programs; and first aid information concerning treatment of specific injuries and illnesses such as burns, deep wounds, and appendicitis. An index to volumes 1 and 2 is included. (LP)

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WILDERNESS MEDICINE NEWSLETTER

For the Recognition, Treatment, and Prevention
of Wilderness Emergencies

Volume 3, Numbers 1-6, 1992

RC019144

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

January/February 1992 Volume 3, Number 1

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New OSHA Guidelines for Hepatitis B Vaccinations

by Ken Thompson

New Occupational Safety and Health Administration (OSHA) standards may affect some outdoor programs. The regulations require that employers provide protection to employees who are at risk of exposure to blood-borne pathogens, specifically HBV (Hepatitis B) and HIV (the virus that leads to AIDS). The regulations involve specific training, record-keeping, and equipment. And, most significantly, the new standard requires employers to provide hepatitis B vaccinations to employees who may come into contact with blood or other bodily secretions.

You can find copies of the regulations, known as Part 1910 of title 29 of the Code of Federal Regulations, in the Federal Register, Vol. 56 No. 235, Friday, December 6, 1991, pages 64175 - 64182. Several key points are summarized below.

1. The regulations specifically require employers to provide certain protections for employees. Volunteers are not covered in the legislation. The law reads, "Occupational Exposure means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties." (Parenteral means piercing mucous membranes or the

(Continued on page 2)

". . . Hepatitis B . . ."

(continued from page 1)

skin barrier through such events as needle sticks, human bites, cuts, and abrasions.) According to Jim Johnson, a regional OSHA representative based in Philadelphia, the regulations were written to cover health care and lab employees and anyone else who "as part of a job" might be exposed. When I asked Mr. Johnson specifically if outdoor trip leaders might be covered in the legislation, his answer was unequivocally yes.

"People may carry both HIV and HBV and not know it. Approximately 1 in 100 Americans carries Hepatitis B."

2) The standard becomes effective on March 6, 1992.

3) By May 5th, the employer will have developed an Exposure Control Plan, which lists the job categories of employees who are at risk and describes how the employer intends to comply with the regulations.

3) By June 4th, the employer will have informed all covered employees of the risks; made copies of the standard available for employees; and instructed employees in universal precautions and in specific, job-related safety procedures. Also, by June 4th, the employer will have established written records of all training, including the names of those who have been trained.

4) By July 6th, the employer, at no expense to the employee, will have provided access for covered employees to the Hepatitis B vaccine series. The employer will also provide, by this date, protective equipment. This equipment will vary depending upon the nature of the job, but will certainly include latex gloves and CPR masks with one-way valves for anyone who is expected to perform first aid.

5) Employers will also provide the option for employees to waive their rights to the vaccine. The following statement is the mandatory language to be used in the waiver:

> **Appendix A to Section 1910.1030--Hepatitis B Vaccine Declination**
> "I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine. I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me."

I first became aware of the legislation when we discussed its impact on Towson State University, which is part of the University of Maryland System. The University is assuming the cost of the vaccine (currently available at $90 through a state purchasing plan) for employees of the health center, police and police aids, and nursing faculty. It is considering how to handle the issue of house-keeping staff who may, for example, be called on to clean up a blood spill if a student is cut on a piece of glass and bleeds on the floor. The new standard has many ramifications and is affecting folks who work in the outdoors.

Case in point: officials at Towson State have determined that students who work as leaders in the outdoor orientation program are covered under the plan. The rationale is 1) they are paid to perform a service, 2) they are required to be trained in first aid as a condition of employment, and 3) they are expected to render first aid to participants on trips.

I contacted several people in different parts of the country who both know the outdoor business and are involved in EMS at the state level. All of these folks had been wrestling with the issue for their programs. Some of the salient points they raised are listed:

"Officials at Towson State have determined that students who work as leaders in the outdoor orientation program are covered under the plan."

- People may carry both HIV and HBV and not know it. Approximately 1 in 100 Americans carries Hepatitis B.
- An estimated four hundred health care workers die each year from Hepatitis B. Those who do not die may face a lifetime of illness and may, unknowingly, infect family members.
- An outdoor leader's risk of exposure is not very high, but it does exist. For example, if you lance a blister and then stick yourself with the needle you could, theoretically, contract HIV or HBV.
- If you follow the universal precautions made popular since the recognition of AIDS (i.e. wearing latex gloves, washing hands, disposing of waste in an approved fashion, etc.), you minimize risk.
- The three injection series costs approximately $120 retail, but may be available for less. The price is coming down. The series is given over a six month period.
- Certainly, protection against communicable diseases must be an integral part of any safety plan. But since many jobs in outdoor leadership positions are short-term, can the effort at immunization be justifie? For example, how do you arrange and pay for the series if your employee is flying in from out of state three days before a course begins?

Is the legislation really aimed at outdoor programs? Not specifically, but it has been fired from a shotgun, not a rifle. Several programs have been affected, thus far. Consult your medical advisor and perhaps an attorney familiar with labor law to determine what obligations you might have. (For more information on Hepatitis B and other communicable diseases see *WMN* v.2 n.3.) **

The Mountain Rescue Association's Clearinghouse: A Library for All Land SAR Teams.

By Howard M. Paul

The amount and variety of information, systems, procedures, tests and forms that have been created in the SAR field over the years are staggering. Some have been widely published, such as Mountain Search and Rescue Techniques by Bill May, of Rocky Mountain Rescue Group, and Wilderness Search and Rescue by Tim Setnicka, both of which have become standard training texts. These and other publications do a fine job of explaining how things are best done.

Many more documents exist, things such as memoranda of understanding between SAR teams and police agencies, search-dog pre-callout check lists, and brochures that warn about lightning hazards in specific regions to name a few.

Virtually every SAR team must develop its own specific manual, procedures, forms and standards. In doing so, much time can be wasted "reinventing the wheel." Such items must exist, and of course do, but how is one to find them?

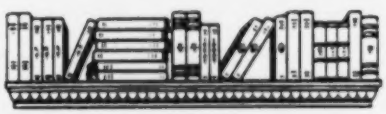
Members of the Mountain Rescue Association realized this, when discussing among themselves materials its member teams had created. In 1989, it established the MRA Clearinghouse, which now serves as a central library open to everyone involved in SAR. The MRA Clearinghouse is growing in size, as more SAR people learn of it.

Documents have been deposited from many locales and include (in addition to those listed above) such items as the Grand Canyon National Park SAR plan, a skills checklist from Larimer County (CO) SAR Team and the Wilderness Medical Society's Position Statements. Other items available for borrowing are as diverse as the MRA Rocky Mountain Region's Accreditation Testing Guide, the State of Idaho's volunteer liability protection act, a wilderness EMT lesson plan and curriculum from the Appalachian Search and Rescue Conference and, from Southern Arizona Rescue Association, a child's PSAR booklet, "What to Take With You When You Go Hiking."

Materials may be borrowed by anyone in the SAR community, there are no restrictions, no library cards, no requirement of first making a deposit. A catalog of hold-

(continued on page 9)

Wilderness Medicine



Bookshelf

Pocket Guide to Wilderness Medicine

by Paul G. Gill, Jr., MD.
Simon & Schuster, 1991
$9.95, 204 pages

Reviewed by Buck Tilton

Once upon a time, in a world not so very far away, there was a wilderness medicine book, Dr. Wilkerson's ground-breaking editorial effort, Medicine for Mountaineering. It was 1967. Twenty-five years later, wild med books proliferate, and keeping up with them has become a chore. Sometimes I feel like I can't bear to drag myself through another medical tome. But this new one, by Dr. Paul Gill, was worth the strain...in fact, it wasn't much of a strain at all.

Dr. Gill, an active member of the Wilderness Medical Society, practices emergency medicine in Rutland, VT., and writes the Sports Medicine column for **Outdoor Life** magazine. And he writes well. His style is easy, unpretentious, informative, understandable...and fun!

After a brief introduction from the executive editor of **Outdoor Life**, the book, in a handy 3.5"x7.5" format, rolls into the basics of life support, and on to the common traumatic injuries. The next 12 chapters deal with environmental emergencies, including chapters on topics often skipped over by other authors, things like motion sickness, rabies, Lyme disease, and other wilderness infections, dental problems, and foot care. The final two chapters are on wilderness survival and wilderness med kits. All the book's information, as far as I can tell, is right up to the minute, and it was very refreshing to read a physician giving out functional wilderness advice, such as this piece on dislocations: "If you don't pop that shoulder (or elbow, finger, or hip) back in right away, swelling and muscle spasm will make the job next to impossible."

All the chapters begin with a snappy intro, some of them from true-life experiences, and many chapters contain a topic that some physicians seem hesitant to address: prevention. Dr. Gill addresses prevention, and addresses it with a voice of reason and practical wisdom.

Several topics are conspicuously absent. There is nothing on marine bites and stings, SCUBA emergencies, psych emergencies, wilderness transportation of the sick and injured, or medical emergencies. But, of course, these deletions are supportable since they're covered well by other authors.

Pocket Guide says it is "for all those outdoor people who want to learn how to take care of themselves and the friends who go with them." In relation to this objective, Dr. Gill approaches his topics with few assumptions, and does indeed help prepare the untrained to take care of themselves and their friends. This is not a book of high-sounding medical jargon and in-depth treatments...it is an extremely practical book for quick reference, it is definitely appropriate for the untrained, and it is surely worth the money if, for no other reason, the sheer delight of reading.

Autographed copies are available directly from Dr. Paul G. Gill, Jr., 15 Springside Road, Middlebury, VT 05753. Send $11.95. **

High Altitude Research: Because It is There

The Department of Anesthesiology at the Maryland Institute for Emergency Medical Services Systems is sponsoring a two-week biomedical expedition to Bolivia. We are seeking subjects to participate for five days in high altitude research. The main focus of the studies is measuring cerebral blood flow and function in a high altitude environment. Non-invasive tools will be used to measure intraocular pressure, visual evoked potentials, retinal arterial geometry, and carotid blood flow. All subjects will be driven to 17,300 feet by land cruiser. The second week is your choice of a mountain climb to Illampu and Hancoma or a trip to the jungles of the Amazon Basin by land cruiser and canoe - for fun!

Total cost is $1,900 from Miami and is tax deductible. For more information, please contact Dr. Bernhard at (410) 328-2628.

Product Review:

The Hamlet Sock

By Buck Tilton

No body part experiences more abuse, no flesh requires more wilderness medical attention than feet. There are only two ways to have happy feet outdoors...keep them naked (weather permitting) or keep them enclosed in footwear that fits and in socks designed to give you maximum comfort and protection. Dr. Murray Hamlet, Director of the Cold Division of the U.S. Army Research Institute of Environmental Medicine (USARIEM), has designed a sock system that reaches new heights (or, in this case, maybe, way-down-lows) of foot care.

When I called Dr. Hamlet, he said: "Better sit down...this'll knock your socks off! First, we blow 50/50 wool fibers and polypropylene fibers into a room. Then we pull them out in a strand with the wool and polypropylene laying down next to each other instead of being twisted around each other. Whey they are twisted, the transference surface for moisture is reduced. Before the fibers are woven together, they're looped to make an outer sock that is a very dense cushion with maximum insulation. It was my idea!"

Dr. Hamlet calls the new sock a Military Field Issue 14" AW (for All-Weather, I think) Boot Sock...I call it the "Hamlet," a word derived from the low German hamm, which means "an enclosed space." Since the crimped fibers of the Hamlet don't smash down much with your body's weight, the insulation potential, measured as a clo value, stays up. The Hamlet's clo value is 1.23. For comparison, the clo value of a Dachstein wool sock is 1.13. And the crimping provides a springy base to walk on. There's a little spandex in the top only, to help hold the sock up, and the toe seam is designed to go flat under pressure, further increasing comfort. Hamlet's take up more room inside your boots than other socks, so, for maximum effectiveness, you might need a boot slightly larger than you normally wear. Hamlet's come in natural or, of course, olive drab, an unappealing name for a greenish color the military seems to favor.

Dr. Hamlet recommends for the inner sock a Double Lay-R Sock Company's 13" Coolmax Blister Free Liner. Coolmax is a new DuPont product of 75 percent polyester, 23 percent nylon, and 2 percent Lycra spandex. The liner is really two socks joined at the top, and the result is maximum heat and moisture transference away from your foot with minimum friction. The "blister-free" part is more than a claim, it's a guarantee or your money back. Color choice is limited to white.

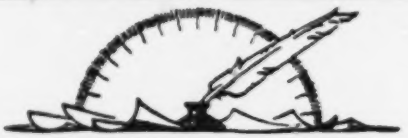
Here's what I can tell you: I wore the recommended system recently on a winter trip. After a few miles, I did "feel" a little moisture on my feet. But after standing around in sub-zero air long enough for my toes to get well-chilled, I started off again, the wet feeling went away, and my toes warmed up just fine. Making sure they were damp at bedtime, I left them laying on the ground. Next morning, my feet warmed right up again inside the socks with a bit of hiking. And the comfort is the greatest I've ever experienced.

What's more, Dr. Hamlet designed this sock system for maximum foot protection and comfort in heat as well as cold. The heat/moisture transference principle that keeps feet warm and dry in winter keeps feet cool and dry in summer. "These socks," says Dr. Hamlet, "have been tested by the military all over the world, and they've gone ga-ga over them."

Double Lay-R markets both socks together as the "Stand-Off" All Weather Environmental Sock System, available as the Military Field Issue System (see above) or the Lightweight Field System with a 10" blister-free liner. The Military System costs about $25, the Lightweight System about $18. Both systems are guaranteed for one year...money back or the socks replaced.

Double Lay-R Sock Company, 62 West State Street, Doylestown, PA 18901. 800-392-8500. (If you ask for a "Hamlet," they might not know what you want.) **

Letters to the Editor



Snakebites, Tourniquets, and Ipecac

Dear Editor:

I just received the last 1991 issue of Wilderness Medicine Newsletter. As usual, it contains interesting material.

The report on electric shocks and snakebite ("The Shocking Truth, page 8) is timely, as the topic still crops up whenever I teach EMT's, paramedics, or the lay public about snakebite. In addition to the article in the June Annals of Emergency Medicine that you cite, there are numerous other references to the inefficacy of electric shock for snakebite. The initial excitement was due to natives in the high mountains of South America who used their cattle prods on the bites of "deadly" snakes and survived. Later studies showed that many natives, who gave no history of a prior bite, had antibodies to the snake venom. The suggestion is that they had received earlier bites, perhaps as a child, and survived, while developing protective antibodies.

The few studies that showed positive effect of electric shock are flawed. There are other good studies that show electric shocks to be useless. As some lecturers put it: "Electric shocks were tried on snakebite back when electricity was first discovered. It didn't work then, and it doesn't work now."

Next, let me comment on tourniquets ("Tourniquet Update," page 9). Tourniquets are seldom needed on the street; direct pressure and elevation will stop almost all major bleeding, even from an amputation. And, slow continued bleeding is not a problem on the street. However, in the wilderness, even slow continued bleeding can lead to death by exsanguination. Yet, we are taught in EMT and similar classes that applying a tourniquet is "deciding to sacrifice a limb to save a life." So I was taught in my EMT class back in the dark ages of EMS, and so I continued to think for many years.

But, after completing medical school and residency and practicing emergency medicine, I finally realized this didn't make sense. I use tourniquets all the time. Whenever I need to repair a bleeding wound in the hand, I just press as much blood as possible out of the hand, inflate a BP cuff around the wrist and clamp the tubes so it doesn't leak, and then operate in a bloodless field. I usually keep the tourniquet on just long enough identify the major bleeding vessels and tie them off, then release the BP cuff and continue the repair. On fingers, I use a rubber band as a tourniquet, and leave it on while I do the whole repair. This was how I was trained, and such bloodless fields are a standard surgical technique. One time when in the wilderness, I had trouble controlling bleeding from a ragged laceration, and I realized that the situation was no different than that in my ED; I put a tourniquet on for about a minute to identify the bleeding vessels and get good direct finger pressure on them with a gauze pad. When I took my fingers off 10 minutes later, the bleeding had stopped. I'm sure that if I hadn't "aimed" my pressure accurately, the blood would have still been coming out. The point is that a tourniquet is used routinely in medical practice **without** the decision to "sacrifice a limb to save a life," and similarly can be useful in the wilderness. Let me now reproduce a section from a draft of the ASRC-CEM Wilderness EMT Curriculum, copyright 1991 and sent to you with permission to publish:

"On occasion, you may find it difficult to adequately stop bleeding, because you can't precisely identify the bleeding vessels. In such a situation, you may be able to use a temporary tourniquet as a tool to identify the bleeding sites. Surgeons and emergency physicians routinely use tourniquets for up to thirty minutes to allow "bloodless field" surgical repairs. Having details not obscured by bleeding makes the surgical repair much easier. Similarly, you can use a tourniquet to locate the bleeding vessels; you then apply direct pressure, and release the tourniquet. If you put a tourniquet on someone's limb, the limb won't become severely painful for about half an hour, and you won't start having irreversible damage to the limb for another fifteen minutes. However, you shouldn't need a tourniquet for more than a few minutes. (You should only apply a tourniquet with on-line medical command or standing orders from your medical director.) Whenever you apply a tourniquet, it must be **wide**, to prevent damage to soft tissues, and **tight**, to prevent any leakage. A blood pressure cuff makes an ideal tourniquet, provided you can ensure that it doesn't deflate. A clamp on the BP cuff tubes will work, provided you watch the cuff to make sure it doesn't leak."

A final note on ipecac ("Ipecac? Gack!" page 9). While the study you cite has merit, it is limited to pediatric patients treated in the hospital. Ipecac still remains valuable for the treatment of pediatric patients at home. (Many pediatric poisoning cases called to a Poison Control Center are handled over the phone with ipecac with no need for transport or for any other treatment.) And, ipecac delays the use of charcoal simply

because you can't give charcoal when someone is vomiting. However, you can give charcoal and ipecac at the same time without making either ineffective. For a wilderness medical kit, ipecac still might be useful; for a parent at home with children, it is still quite useful. As your article noted, however, it is out of favor in the ED, primarily because we can use gastric lavage with a big tube to obtain results similar to, or better than, ipecac-induced vomiting without persistent vomiting. Thank you for the opportunity to express my opinions.

Sincerely yours,
Keith Conover, M.D.

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2. Howe NR, Meisenheimer JLJ. Electric shock does not save snakebitten rats. Ann Emerg Med 1988;17(3):254-6.

3. Sutherland SK, Coulter AR. Early management of bites by the eastern diamondback rattlesnake (Crotalus adamanteus): Studies in monkeys (Macaca fascicularis). Am J Trop Med Hyg 1981;30(2):497-500.

4. Tandberg D, Divan BG, McLeod JW. Ipecac-induced emesis versus gastric labage; a controlled study in normal adults. Am J Emerg Med 1986;15:205-9.

Substance Abuse Center for Nasal Spray Addicts?!

Dear Editors,

No one knows noses . . . . That's what I repeat to myself every winter. When it comes to nasal spray decongestants, it seems everyone has a different opinion. I've heard you should use them only if you're stuffed up, only if your nose is runny, as a preventative measure once a day, and of course the most feared advice is don't use them at all, they're highly addictive. I must confess I've never seen or heard of a center for drug alcohol, substance and nasal spray abuse. Could you please shed some insight on this American folklore and annual winter dilemma?

Stay well,
Harrison Weisner
New York, NY.

Stuffy noses plague many people, and many people get relief from nasal decongestant sprays. But they can be harmful, and addicting.

Nasal sprays that break sinus congestion, used carefully on a limited basis, are of no risk to your health. The general recommendation is what I call the 4 x 4 Rule: use nasal sprays no more than four times a day for no more than four days. If used more frequently, they may irritate the sensitive membranes of your nose, resulting in a burning, stinging feeling. Overuse may lead to a constant irritation and increased congestion, a problem called rhinitis medicamentosus (nose-inflamed-by-medicine). Ultimately, you may need medication to treat what over-medication has caused.

When used too often for too long. nasal sprays may produce addiction, and you'll need more and more of the medication more and more often to feel OK. Most people can kick the habit simply by stopping use of the spray. It doesn't seem to be working, consult an ENT, a doc specializing in cars, noses, and throats.

Nasal sprays should not be used by folks with high blood pressure. They may counteract the effects of drugs given for treatment of hypertension.

Here are some alternatives to nasal decongestant sprays:

- *Use saline sprays . . . nothing but lightly salted water which humidifies nasal linings without any side effects.*
- *Sleep with your head slightly raised to reduce swollen membranes.*
- *Maintain a daily exercise program which produces adrenaline, a natural decongestant. And exercise outdoors where the air is naturally cooler and moister.*
- *Turn down the thermostat . . . noses like cooler temps. But keep your feet warm because cold feet require more blood which redistributes your body's blood supply which may increase nasal congestion.*
- *Apply a mentholated ointment gently inside your nose . . . it constructs blood vessels and may relieve congestion.*
- *Try an oral decongestant but remember this from the February 1992 University of California at Berkeley Wellness Letter: After a week of testing with 60 volunteers" . . . aspirin and acetaminophen increased nasal congestion while ibuprofen and placebo did not. Many combination medications contain acetaminophen along with decongestants, antihistamines, and cough suppressants." These "may work against one another." If you wish to use a decongestant, use a simple decongestant.*

Thanks for your question.
- Ed.

SOLO Wilderness and Emergency Medicine Seminars: 1992 Schedule

Wilderness First Responder, $675* (10 days)

- Mar 10 - 21 (NCOBS, Morganton, NC)
- Mar 19 - 28 (Passages to Adv, WV)
- Mar 21 - 29 (SOLO)
- Apr 6 - 16 (AMC, NH)
- May 11 - 20 (Wolfcreek, GA)
- May 26 - Jun 6 (Hulbert, VT)

Wilderness Emergency Medical Technician, $1325* (one month)

- April 6 - May 1 (AMC, NH)
- May 18 - June 12 (SOLO)
- June 29 - July 24 (SOLO)
- July 27 - August 21 (Passages to Adventure, WV)

*Residential courses include lodging, meals, all instructional materials, textbooks, and examination and certification fees. Costs may vary for courses at sites other than SOLO.

Wilderness/Rural EMT Module at SOLO, $365

Designed specifically for EMT's and Paramedics, this module combines wilderness and rural techniques with the practical issues of extended care. Those successfully completing the course will receive SOLO WEMT certification. The curriculum is based on the NAEMSP-approved protocols and has been reviewed and approved by the State of NH and the NREMT for CEU's. Course cost includes lodging, meals, materials, and certification fees.

- Jun 18 - 22 (SOLO)

SOLO offers a full range of emergency medicine courses including NREMT EMT-I and Paramedic modules, and Wilderness Trauma Life Support for physicians. SOLO also offers a variety of other courses, including High Angle Rescue (2 days) and Ropes Rescue (5 days). New offerings from SOLO include ALEC, a leadership training course, and instruction in marine medicine through the Marine Medicine Institute.

For more information, write to:
SOLO, RFD 1, Box 163, Tasker Hill, Conway, New Hampshire, 03818
Or call: (603) 447-6711

Wilderness Medical Training in Pennsylvania

The Center for Emergency Medicine of Western Pennsylvania offers several courses designed specifically for the currently certified, urban, pre-hospital provider:

- **Basic Wilderness Rescue**--Survial skills, SAR, patient packaging, and evacuation techniques. Tuition is $100, October 17 - 18, 1992.
- **WEMT 1 and WEMT 2**--Emphasis on environmental and wilderness emergencies, extended patient care, and advanced techniques. WEMT 1, tuition is $100, November 7 - 8, 1992. WEMT 2, tuition is $125, November 20 - 22, 1992.
- **Wilderness Command Physician**--Directing patient care outside traditional settings and medicolegal issues. Tuition is $225, November 21 - 22, 1992.

For additional information: Jack T. Grandey, EMT-P, Course Corrdinator, The center for Emergency Medicine, 230 McKee Place Suite 500, Pittsburgh, PA 15213. (412) 578-3200.

Wilderness Medicine Institute

P.O. Box 9, Pitkin, Colorado, 81241
Telephone: (303) 641-3572
Answering Service: (303) 641-4766

Wilderness Emergency Medical Technician Course
Gunnison, Colorado
May 18 - June 12, 1992

This course is designed for outdoor leaders, backcountry rangers, rural ambulance attendants, and other individuals who provide emergency care in remote settings. While fulfilling the DOT minimum requirements for certification, this 160-hour program expands the topics to address the issues involved in extended care and introduces backcountry rescue techniques.

Certifications: SOLO's Wilderness EMT, National Registry EMT-B, and American Heart Association's CPR.

Tuition: The cost of instruction, textbooks, handouts, and exam fees is $600. A discount will be given to WEA members.

Lodging and Meals: $1201.00, write for details.

Registration: Enrollment is limited. To reserve a space send your name, address, and phone number, course name and dates, along with a non-refundable $300 deposit to **Wilderness Medicine Institute.**

Additional Offerings in 1992:

- Mar 21 -29 WFR at Pitkin, CO
- Jun 13 - 21 WFR at Pelican School, Santa Cruz, CA
- Jul 27 - Aug 21 WEMT in Pitkin, CO
- Nov 24 - Dec 18 Kelly, Wy [to register for this course, call Teton Science School at (307) 733-4765]
- Several 16-hour Wilderness First Aid courses are available in late May and June (call WMI for more information)

"MRA Clearinghouse . . ."

(continued from page 3)

ings is available by request. The MRA would love to receive a Clearinghouse deposit from your SAR organization. What items you might wonder? If you or your organization has found it beneficial, no doubt so will others - so this may include virtually anything! Deposits can be either printed or on computer diskette, 3-1/2" or 5-1/2" (DS,DD) for IBM Wordperfect 5, Lotus 1-2-3 Plus or Lotus Symphony. Diskette deposits should be accompanied by a printed copy. In order to preserve materials, only photocopies of materials will be loaned, so please be certain any printed submissions you make are of a quality good enough to photocopy.

"Materials may be borrowed by anyone in the SAR community; there are no restrictions, no library cards, no requirement of first making a deposit. A catalog of holdings is available by request."

If your borrow request is lengthy and will require significant photocopying, is heavy in mailing weight, or you need material telefaxed to you, you will be asked to cover such costs. Deposits or borrow requests should be sent to: Clearinghouse, Mountain Rescue Association, 2144 S. 1100 E., Suite 150-375, Salt Lake City, UT 84106. Clearinghouse Librarian Bruce Beckmann can be telephoned in the evening hours (Pacific time) at 206-392-0194. If you would like to receive general information about the Mountain Rescue Association, or are interested in MRA membership, write to MRA Executive Secretary Lui Clem at the above address.

Howard M. Paul is editor of the Mountain Rescue Association's quarterly publication, Rescue Forum. A member of the MRA's Alpine Rescue Team of Evergreen, Colo., he is a director of the Colorado Search and Rescue Board and serves on the board of directors of Hug-A-Tree and Survive of Colorado, Inc. **

WMN Dispatches

New EMT Basic Curriculum Update

More than a year ago the National Highway Traffic Safety Administration commissioned Samaritan Health Services to revise the national standard EMT-basic curriculum. Since Wilderness EMT's must be certified, at least, as an EMT-B before being certified as a WEMT, the new curriculum will probably affect WEMT courses nationwide. While the project is not yet completed, Samaritan expects to release their recommendations soon. Being considered for final inclusion in the new training guidelines are:

- Pharyngeotracheal lumen airways for unresponsive patients whose assessment indicates difficulties in airway maintenance/protection and ventilation.
- Automated defibrillators for unresponsive, non-ventilating, pulseless patients over 60 pounds.
- Needle chest decompression with a 20-gauge needle for unresponsive patients who are in respiratory arrest, are difficult to ventilate, have chest injury, breath sounds absent on one side, and adult systolic BP of less than 90. Infants and small children: poor perfusion and no other abnormal assessment findings or indications to suggest additional problems.
- Subcutaneous injection of 1:1000 epinephrine with pre-loaded syringes for responsive and unresponsive patients with no injuries and a history of allergic contact by inhalation, ingestion, bite or sting with one or more of following: respiratory distress, wheezing or coughing, decreased perfusion, or generalized hives.
- Nasogastric tube insertion for children less than 6 years of age with abdominal distention, and respiratory failure.
- Oral glucose for uninjured patients who are confused, disoriented or combative.
- PASG application for adult patients with pelvic pain, trauma and systolic BP less than 90.
- Activated charcoal for responsive patients with a history of toxic ingestions.
- Endotracheal intubation for unresponsive patients who assessment indicates difficulties in airway maintenance/protection and ventilation. (This will be offered as an adjunct to airway interventions so that the responsible authority, if it chooses, may include it in its jurisdiction).
- Sublingual nitroglycerin for assisting patients who have chest pain, history of chest pain relieved by nitro, a systolic BP less than 110, their own nitroglycerin, and who have not already taken three doses of nitro.
- Nebulized albuterol for patients who are not injured and have a history of COPD or asthma, and are over one year of age. One unit dose for patients 6 years old and older. One half-unit dose for children 1 to 6 years old.

According to Samaritan, items that have been considered and excluded from the curriculum include intravenous lines, intraosseous lines, and esophageal intubation airways (for example, EOAs).

(Adapted from **EMS Insider**, *Vol. 19, no. 1, Jan. 1992.)*

Insect Repellent Warnings

More than 200 commercial insect repellents contain a chemical compound known as R-11 which has been recalled from the market due to the recent discovery of the risk of serious toxicity. Tests indicate R-11 causes reproductive problems and tumor formations in laboratory animals. On the back label of the repellents R-11 is probably listed under is extended name--2,3,4,5-B, (2 butylene) tetrahydro-2-furaldehyde--a name which alone should be enough to make it dangerous. Most stores have already been alerted to remove products containing R-11 form their shelves, and manufacturers are reformulating their repellents to remove the dangerous chemical. But check what you have on hand.

And a reminder that DEET-containing repellents have been proven to collect in the human body with potentially dangerous results. The problem is more in the concentration than in the application. U.S. military troops in Vietnam used a 75% DEET/25% alcohol solution but now use DEET in only a 35% concentration with equal repellent results, and, of course, without the dangerous accumulation of the chemical in cells of the body. Many insect repellents with a 30% concentration of DEET are available, and will repel insects with a ferocity equal to 100% concentrations. The extended name of DEET is n,n diethyl metatoluamide.

(Note: Thanks to William W. Forgey, MD, for this information.)

ASTM Update

As we reported last spring, the American Society for Testing and Materials (ASTM) is developing standards for the practice and expectations of EMT's and First Responders functioning in extreme environments. Two task groups, Search and Rescue (F32) and Emergency Medical Services (F30), met in San Diego in early November and decided to work together to avoid a duplication of effort. The F32 SAR task group will look at developing the practice within the environment and F30 wilderness EMS group will focus on training descriptions and requirements.

The initial drafts of standards will be titled "The scope of performance of an EMT or First Responder who practices in the extreme or delayed transport environment." While the impetus to establish these standards came from wilderness medical world, the process has drawn interest from those who practice in rural areas and those involved with disaster situations. Delayed or prolonged transport with basic skills providers is not unique to the backcountry.

Many controversial areas of medical practice will be addressed and specific scopes of applicability defined before the process is complete.

If you would like to become involved in the process, feel free to contact John J. Clair, 35 Wagon Wheel Trail, Saratoga Springs, NY 12866, (518) 584-8234 (H), or (518) 474-2219 (W).

UIAA Approved

Many of you have noticed the label on your climbing rope, or on another piece of gear, has said you were safely approved by the UIAA. Some of you may even know that the UIAA is the International Union of Alpine Associations. Few can explain that the UIAA is a group of climbing organizations made up of what are referred to as "federations," and that only one federation from each country represented in the UIAA has the right to vote. The American Alpine Club (AAC) is the voting member from the United States. More than one federation from a single country may be a member of the UIAA, but they attend meetings only as observers.

The UIAA is governed by an Executive Committee whose current president is Dr. Peitro Segantini. The function of the organization is carried on by eight commissions, or working groups. Each federation may nominate someone to represent them on each commission, but the final selection of representatives is made by the Executive Committee. These commissions are: Safety, Mountain Protection, Youth, Expeditions, Mountaineering, Climbing Competition, Documentation...and Medical.

UIAA's Medical Commission gives advice on high altitude problems and other aspects of mountain medicine. Information may be obtained from Dr. Charles Clarke, UIAA Mountain Medicine Center, St. Bartholomew's Hospital, London, England EC1 7BE.

The Wilderness Medicine Newsletter, Inc.

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ISSN 1059-6518

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The *Wilderness Medicine Newsletter* is published six times a year: January/February, March/April, May/June, July/August, September/October, November/December. Subscription rates are: $20 for a year, $37 for two years. Back issues are available upon request.

Correspondence should be sent to: *Wilderness Medicine Newsletter*, 1208 St. Francis Road, Bel Air, Maryland, 21014. Questions and comments are welcomed.

The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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Wilderness Medicine Conferences

WEMT Conference hosted by the National Outdoor Leadership School

NOLS will host a conference for Wilderness Emergency Medical Technicians, First Responders, and other pre-hospital providers in **Jackson Hole on June 6-7, 1992.** Presenters are experienced in wilderness travel, wilderness medicine and education. The keynote address "Managing the Extended Crisis" will be given by Bill Pierce, past president of NASAR. Bill has been IC at hundreds of crises, including the Yellowstone fires and the Mexico City earthquake disasters.

Participants should bring notebooks and outdoor gear for pre- and post-conference activities. The conference fee of $150 includes registration, meals, and proceedings. For more information on the NOLS WEMT Conference contact **NOLS WEMT Conference, PO Box AA, Lander, WY 82520 or call (307) 332-6973.**

Pre-Hospital Wilderness Medicine Conference

April 9 - 11, 1992, Park City, Utah

This conference will be held at the Olympia Hotel in Park City and is sponsored by the University of Utah, Health Education department and co-sponsored by Life Flight. Packed with hands-on experience, the tentative agenda includes practical sessions on poisonous plants, biking and diving emergencies, helicopter rescue, cave and water rescue and more. CME's have been applied for; 2 hours of University credit are available. For content information contact Dawn Black (801) 581-8486, or Les Chatelain (801) 581-4512. For registration information contact: Conferences and Institutes, University of Utah, 2174 Annex, Salt Lake City, Utah 84112, (801) 581-5809.

Other Conferences

By the time you receive this newsletter, these conferences will have passed. Nevertheless, we provide the following information in case you'd like to get in touch with the conference organizers:

First Annual International Forum:
Critical Decisions in Hypothermia

February 27 - 28, 1992, Portland, Oregon. Contact Marsha Jack, Department of Continuing Medical Education, Emanuel Hospital and Health Center, 2801 N. Gantenbein, Portland, OR 97227, (502) 280-4179.

Wilderness Medicine, Travel Medicine, Sports Medicine

February 21 - 23, 1992, McCall, Idaho. Contact Marie Chester, Ada County Medical Society, P.O. Box 2668, Boise, ID 83701, (208) 386-2135.

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FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGERCIES

About the Wilderness Medicine Newsletter Index . . .

This index lists the topics covered by the *WMN* since its beginnings in May of 1988. The first 18 issues of the *WMN*, then published monthly, were about 3,500 words in length. Issues 19 - 25 included twice as much information and were published every other month. Beginning in 1991 we adopted a numbering system that incorporates both Volume and Issue numbers. Those first 25 issues are, collectively, Volume 1. Volume 2 comprises the six issues in 1991. The Volume number now changes on a yearly basis.

Using the Index

Following each entry you will see a series of boldface characters representing the specific issue (i.e. Volume 1, Issue 8 looks like this **v1n8**). The next number, preceded by the letter "p", indicates the page on which you will find the article. If the topic has been covered more than once, you will see several sets of issue and page numbers, separated by commas.

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

March/April 1992 Volume 3, Number 2

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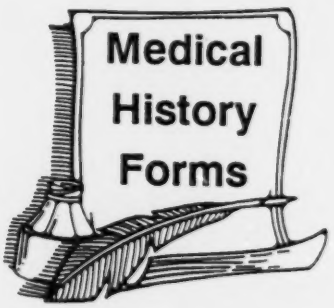

by Ken Thompson

When a handful of close companions ventures into the wild, their trip is usually accompanied by an exchange of information about each other: Ann will relate that she has had a sinus infection and is taking an antibiotic, Paul is getting over a mild bug that has left him a little weak, and, well, everyone knows that Kelly sprained her ankle playing volleyball last month.

When we travel with people we do not know well, when we are the leaders of an organized trip, and especially when we are paid to be "in charge," a more formal method of gathering information is required. The medical history form serves many important roles in outdoor adventure programming:

- it provides information that can be useful, even life-saving, in a medical emergency;
- it provides emergency room personnel with information that will guide their treatment of the sick and injured;
- it warns trip leaders of potential problems they might encounter (e.g. anaphylaxis, psychiatric dis-

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" . . . Medical History Forms"

(continued from page 1)

orders) and may suggest adaptations of course design;
- it may be used to direct clients to courses that are most appropriate;
- it may be used to screen clients out of trips when their participation might present an unacceptable risk to them or the group;
- it can help you plan menus;
- it will give you a sense of the general level of fitness participants have;
- it places some responsibility upon clients for their safety and encourages their active participation in that regard;
- it informs clients of your concern about their safety and health;
- it may provide certain permissions (e.g. for anesthesia, surgery, etc.) for emergency treatment; and,
- it performs an essential role in your safety and risk management plans.

The following sections list the data you may want to collect on your form. For the sake of clarity, I have divided the information into three categories: Personal Information, Medical History, and Agreements.

Personal Information

This category includes emergency telephone numbers and insurance policy information.

1) name, address, phone number

2) age, birth date, gender, height, weight

3) name, relationship to the client, and work and home phone numbers of whom to contact in case of emergency

4) medical insurance provider and policy number

5) personal physician's name and telephone

(Note: Some programs insist that all participants carry some form of accident and medical insurance. Other programs purchase a plan for participants. Whichever route you take, securing treatment at an ER is much less problematic if you walk in with a policy number in hand. You will also want to know if a client's plan requires pre-authorization.)

Medical History

The medical history should answer the **AMP** of an **AMPLE** history (**A**llergies, **M**edications, **P**revious illness or injury, **L**ast food and drink, **E**vents leading up to the crisis). Since obtaining an **AMPLE** history is an important step in assessing any patient, collecting this information in advance will save time at the scene of an emergency and will probably result in greater accuracy.

Allergies

1) List any allergies you have to medications.

2) List any allergies you have to foods. (Note: An allergy to shellfish may indicate an allergy to iodine. Keep this in mind if you routinely use iodine for water disinfection.)

3) List any special dietary considerations.

4) Have you ever had a systemic reaction to an insect sting? If so, please speak to your physician about carrying your own Ana-kit or Epi-pen. If your physician advises it, ask for the appropriate prescription and instructions in its use. Bring the medication with you and inform your trip leader where you will keep it. (Note: This statement does not imply that the program should rely on clients as the only source of epinephrine. No one can predict who might have an anaphylactic reaction for the first time. Many outdoor programs consider an Ana-kit or Epi-pen a standard part of the first aid kit, instruct guides in its use, and distribute a protocol for when to administer an injection.)

Medications

1) List any prescription medications you are currently taking, the dosage, and what condition you are taking them for. (Note: Remind clients to bring two supplies of the medication. The spare should be carried by an instruc-

"When we travel with people we do not know well, when we are the leaders of an organized trip, and especially when we are paid to be in charge, a more formal method of gathering information is required."

> *"Generally speaking, the more strenuous the trip, the longer and more detailed the medical history needs to be."*

tor or logistics person in a watertight container and kept isolated from extremes of temperature. On water-based trips, the spare set should be carried in a separate boat.)

2) List any over-the-counter medications you routinely take and for what purpose.

3) Note the date of your last tetanus booster. (Note: You may want to require that clients who have not had a booster in the last ten years have one before the trip. A booster within ten years should be sufficient to provide protection for minor wounds. Wounds considered "high risk"--crush injuries, punctures, bites, etc.--may require a booster within five years. So it is possible that even with evidence of a booster, say, 7 years ago, the attending ER doc may opt to give the patient another dose.)

History

Generally speaking, the more strenuous the trip, the longer and more detailed the medical history needs to be. For example, you would require more information before an expedition to Denali than before a birding hike in Central Park. Another factor that influences the specificity of the form is the nature of the client group. For example, you would want a rather complete psychological history if the trip was intended as therapy for a group of psychiatric patients.

These sample questions are not designed for screening purposes. Nevertheless, they are probably specific enough to expose potential problems and initiate a client/program dialogue prior to the trip.

1) Do you have any chronic medical conditions (e.g. asthma, diabetes, seizure disorder, high blood pressure, etc.)?

2) List the date and reason for any hospitalizations.

3) Are you currently being treated for any illness or condition? If so, please provide details.

4) List any hernias, sprains, strains, fractures or joint problems you have had. (Note: This question searches for problems or weaknesses that might be exacerbated by activity. Dr. William Forgey stresses that, to ensure a successful leadership experience for other participants, it may be important to screen out people having previous, problematic, lower-extremity injuries--WEA Curriculum Guide, 1991.)

5) Have you seen a psychologist or psychiatrist during the past two years? *If so, please give the purpose.*

6) Rate your current activity level. Are you very active, active, sedentary?

(Note: Be as specific as you need to be to assess an individual's ability to handle the physical demands of a trip.)

Agreements

The following list is not intended to be all inclusive but should suggest the nature of the understandings you should have with clients who will be traveling with you. Have them sign the form and make it clear that their signature indicates that they have read and understood the entire form. Whenever minors are involved, you must also require the signature of a parent or legal guardian.

1) I give my permission for any anesthesia, surgery, or other medical care that might be necessary. (Note: This first statement is essential, particularly where minors are involved.)

> *"It is also advisable to develop a good working relationship with a doctor who understands the nature of the trips you lead and is willing to advise you on specific medical conditions."*

2) I understand the rigorous nature of the trip. (Note: Be specific about the nature of the trip. For example, "will travel on steep trails carrying backpacks weighing 50 lbs.")

3) I understand that professional medical attention could be several hours to several days away.

4) I understand that I might be held responsible for the cost of an evacuation if I require one. (Follow local protocols.)

(continued on page 4)

" . . . Medical History Forms"

(continued from page 3)

5) I understand the importance of this form and have answered all statements fully and truthfully.

6) I understand that if I am at all uncertain about my ability to participate in this trip, it is my obligation to consult my personal physician. (Note: Some programs require a physician's approval based on a physical evaluation within the past six months or one year.)

Follow-up

If any responses concern you (perhaps someone lists a heart condition, Osgood-Schlatter's disease, or some other ailment you've never heard of) call the client and talk it over. If it sounds questionable have them get their doctor's OK to go on the trip. It is also advisable to develop a good working relationship with a doctor who understands the nature of the trips you lead and is willing to advise you on specific medical conditions.

Screening

Using forms to actually screen clients out of a program is a complicated task and should be done under the guidance of a physician who is very familiar with your program. The process is directed by the nature and length of the trip, the terrain and method of travel, the age and make-up of the group, goals of the expedition, and various other factors. In future issues of the WMN we will explore using forms for specific purposes and specific types of trips.

Record-Keeping

Remember that the questions on a medical history form are about as personal as you can get. Keep them confidential! Instructors, naturally, should review the information prior to heading into the wilds and should carry the original forms with the group whenever they are in the field. You will probably want to keep another copy in the office or basecamp. Most programs keep forms for seven years after the trip. If a lawsuit is brought against you, the medical history form could be an important piece of evidence. **

Wilderness Medicine Institute

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Pitkin, Colorado, 81241

Telephone: (303) 641-3572

Answering Service: (303) 641-4766

Some of WMI's 1992 Offerings:

- Jun 13 - 21 WFR at Pelican School, Santa Cruz, CA
- Jul 27 - Aug 21 WEMT in Pitkin, CO
- Nov 24 - Dec 18 Kelly, Wy [to register for this course, call Teton Science School at (307) 733-4765]
- Several 16-hour Wilderness First Aid courses are available in late May and June (call WMI for more information)

Wilderness Emergency Medical Technician Course

This course is designed for outdoor leaders, backcountry rangers, rural ambulance attendants, and other individuals who provide emergency care in remote settings. While fulfilling the DOT minimum requirements for certification, this 160-hour program expands the topics to address the issues involved in extended care and introduces backcountry rescue techniques.

Certifications: SOLO's Wilderness EMT, National Registry EMT-B, and American Heart Association's CPR.

Fibromyalgia: Chronic Muscle Pain

By Buck Tilton

Patient: "It feels like my bones ache! A deep, dull pain that comes and goes. Backpacking used to be my greatest thrill. Now I hardly ever go! I feel too tired all the time."

Doctor: "Could be fibromyalgia, sometimes called chronic muscle pain syndrome. There are ways to feel better, maybe even eliminate your symptoms altogether."

What's Wrong?

Well, nobody exactly knows. Muscles ache for no reason. They ache within muscle masses and sometimes where muscles join their tendons, but not in the joints themselves. Pain persists long after exercise, and long after an injury should have healed. Muscles feel weak, tired, and stiff. A common complaint is "I just ache all over." Or maybe the patient will have specific pain, in an arm and shoulder and the same side of the neck, or in a leg and the same side of the lower back. Laboratory tests, examinations by muscle specialists, and neurologic evaluations will reveal what appears to be a normal patient. Sometimes probing the muscle will reveal a tender spot. These tender spots usually stay put, not moving from one place to another over time.

"Patients with tension myalgia often have poor posture, a job that requires them to repeat the same motion over and over, and the habit of holding some of their muscles tense all the time."

Without tender spots in muscles, or where muscles join tendons, assessment may be made on 1) length of time of pain (usually more than three months), 2) description of the area that hurts ("It hurts all over."), and 3) test results, by a qualified physician, that show no other reason for the pain.

Emotional, as well as physical stress can exacerbate fibromyalgia, and the problem is sometimes referred to as "tension myalgia." Patients with tension myalgia often have poor posture, a job that requires them to repeat the same motion over and over, and the habit of holding some of their muscles (e.g. shoulders) tense all the time. Many of these people report difficulty falling asleep, and they awake at night with aching muscles. Most of these people have let themselves slip out of shape, and the discomfort causes them to slip further. They start to feel tired all the time. Changes in the weather, say many patients, causes their symptoms to worsen, and a hot soak in the tub makes them feel better.

What Can Be Done?

Over the last 40 years, thousands of patients have been treated for fibromyalgia at the Mayo Clinic Department of Physical Medicine and Rehabilitation (Rochester, MN 55905). The Clinic reports varying degrees of success, and makes these suggestions:

1) Take charge of your own care. Learn what you can do, and accept responsibility for doing it.

2) Learn correct posture and the proper way to use your muscles to lift, push, and pull. Stretch daily and appropriately. A qualified physical therapist can help.

3) Get into shape with aerobic exercise. Research has shown that moderate aerobic exercise, even 30-minute periods of brisk walking three times per week, can alleviate the symptoms of fibromyalgia.

4) Learn to relax. Learn to manage stress.

5) Forget medications. Painkillers and anti-inflammatory drugs usually do not help with fibromyalgia.

Conclusion

Patient: "So, what can I do?"

Doctor: "Take charge of your life! Relax, stretch, get back into shape, and get back out in the wilderness where you belong!" **

Letters to the Editor

Inflatable Splints

Dear WMN,

This fall I began working as the health care coordinator of an educational institution. We sponsor a variety of programs, all having an outdoor component. A few of the wilderness trips are in remote (plane-access) areas for four weeks or more.

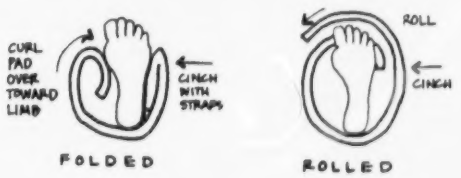
I am in the process of reviewing first aid kits for these trips. I would like to know your opinion of inflatable splints. They have always been used here in the past. I am especially concerned about the arm splint as it does not seem to be as comfortable as would a splint which you could use a sling with. Also, many of the splints have cracks which leak air and I cannot find the leak. Is there a general consensus regarding a good, reliable multipurpose splint? I look forward to your reply.

Dear Reader,

The problem you describe with your air splints is common and, for that reason, many outdoor programs have stopped carrying them. Most will crack at temperatures below freezing, and, once applied, they need to be continually monitored because, being gas-filled sacks, changes in both barometric pressure (altitude) and ambient temperature will change the fit of the splint, resulting in either loss of support or over-tightening. On the other hand, air splints have some advantages. For example, they do a good job of compressing the limb and, for that reason, can be used to tamponade bleeding as well as immobilize a fracture.

The good, reliable multipupose splint you are seeking may be the Sam Splint (trademark). The Sam is a malleable aluminum splint covered on both sides with thin, durable foam padding. It can be folded any way you like and then crimped to provide rigidity. Its versatility makes it about the only splint you'll need for the arm or lower leg. It can also be fashioned into a serviceable cervical collar. Weighing in at only five ounces the Sam will not add appreciable weight to your kit. Dr. Bill Forgey, wilderness medicine expert, says he never bothered to recommend that backcountry users carry commercial splints until the Sam hit the market, now he lists it as part of his orthopedic unit for expeditions.

Before you invest in a new fleet of splints, however, remember that the average backpacker carries more splinting material than he or she will use in several lifetimes. The frames from internal frame backpacks can be removed and, combined with an ensolite for padding, will serve as well as most, and better than some, commercially made splints. Another useful technique is to lay the broken part on a cradle of ensolite and roll the edges of the foam snugly against the limb to add stability and padding.



(from NOLS Wilderness First Aid)

Another sleeping pad, the inflatable Thermarest (trademark), makes a very effective air splint, that is, if its owner will be willing to surrender it. Place the pad, while it is deflated and the valve closed, around the injured limb. Then secure it in place with cravats or nylon webbing. When you open the valve, the pad will inflate, conforming around the injured site and filling in all the voids. Check distal circulation, sensation, and movement and seal the valve.

Based on the length and location of your trips, there is one other splint you might consider caching at basecamp. That is the KTD (Kendrick Traction Device). Several methods of improvising mechanical traction on a broken femur work well (see WMN v1n19) but require a bit of fussing to get just right and on an extended transport are cumbersome. The KTD, about the size and weight of a large sandwich, would be easier to manage on a patient who was being held for a long time or air-evacuated.

Indiana Camp Supply (see their ad in this issue) carries a wide variety of splints, including all that are mentioned here.

- Ken Thompson, Ed.

Good Lung Up? or Good Lung Down?

By Buck Tilton

Your patient fell. Before he fell he wasn't your patient, just another climber, but now he has unilateral chest pain, significant bruising on the same side, and difficulty breathing. He can't walk, so you've improvised a sturdy litter (see The Basic Essentials of Rescue from the Backcountry, ICS Books, Merrillville, IN, 1991), but how do you package your patient for maximum use of the good lung? Flat on his back...good lung up...semi-sitting position...or should you periodically shift your patient from one side to the other to maximize comfort?

Lungs are cone-shaped, with larger and fewer alveoli at the top, and smaller and more alveoli at the bottom. The bottom part, because of gravity and hydrostatic pressure, gets better perfusion and better ventilation than the upper part. In fact, the dependent part of each lung gets approximately 18 times more blood and 3-1/2 times more tidal volume than the nondependent (upper part). And maximum oxygenation, as you know, occurs where the best ventilated areas are also the best perfused areas.

In a patient with a compromised lung, the result of injury (pneumothorax, unilateral trauma) or disease (pneumonia), placing the good lung down keeps the better ventilated lung greatly more perfused. The result: the patient lives a longer, happier, better-oxygenated life. (The only exception would be a patient who has significant pulmonary hemorrhage, in which case the blood from the damaged lung would gravitate into the good side, increasing difficulty breathing.)

Oxygenation is further improved if the patient can be packaged with the head 10 to 15 degrees higher than the feet. At least, when you take a break, and put the litter down, attempt to place the litter in a slightly head-high position.

If the evacuation runs long and the patient grows distressed by discomfort, he may be moved, if injuries allow, to a semi-Fowler's (semi-sitting) position for 60 to 90 minutes from time-to-time. Tests show that moving a patient to a semi-Fowler's position causes a drop in oxygen saturation, but it returns to almost the same as good-lung-down position in about 15 minutes. Monitor your patient for signs of hypoxia...cyanosis, restlessness, confusion, increased respirator effort and rate...and return him to the stable side position, good lung down, if you see these signs. (Note: normal ratio of heart beats to breaths is approximately one (1) beat to four (4) breaths.)

Proper patient positioning can often mean the difference between success and failure in long-term care.

Reference:

Evelyn M.J. Yeaw, American Journal of Nursing, March 1992, **How Position Affects Oxygenation.** **

Appendicitis?

By Ken Thompson

Probably a vestige of an earlier time, the worm-like appendix, when it becomes inflamed, can cause many problems. Some expeditioners have had theirs' removed prophylactically rather than risk an appendicitis in the middle of nowhere.

The first step in assessing any patient experiencing gastrointestinal distress, is to gather a thorough history. Even if your findings mean nothing to you, they will be useful when the patient goes to a hospital. The onset of appendicitis is sometimes preceded by indigestion or flatulence several hours to one day in advance of the attack. The patient may complain of having had several slight bouts with pain in the lower right quadrant of the abdomen. There may be accompanying constipation, or, in the case of children, diarrhea. The actual attack may involve the following symptoms:

Pain. In most cases pain begins in the umbilical or the epigastric region, which is several inches above the umbilicus. The patient may complain of pain all over the abdomen or of indigestion or gas which s/he thinks should be relieved by a bowel movement or passing gas. This is called, aptly enough, the "downward urge." In an appendicitis, however, the expulsion of stool and or gas will probably not bring any relief. Usually after several hours of this vague discomfort the pain will localize to the lower right quadrant of the abdomen (that area below and to the right of the umbilicus).

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An Historical Perspective :

Body Core Temperature Measurement

By Buck Tilton

As early as 2800 BC, the Egyptians, using the scanning sensitivity of fingers over the surface of the body, recognized that the body produces heat, and that heat increases with disease. Thus, they provided the first recorded references to fever.

Hippocrates, in his treatises on Epidemics and Prognostics, refers to fever in terms of time, and qualifies fever as malignant, benign, intense, or acute. Praxagoras, about the 4th Century BC, associated fever with changes in the pulse. While he described the skin as warm or hot, the pulse rate was figuratively compared to antelopes or turtles.

By 1622, a German alchemist named Mylius recognized four degrees of heat: the human body, the June sunshine, fire, and fusion (the temperature required to melt several metals together). Shortly thereafter, Galileo invented the thermoscope, a glass bulb showing expansion of air and heat. Sanctorious, anatomy professor at Padua, took Galileo's thermoscope, colored the glass, and made equidistant markings giving a reference using fire and ice. Dr. Sanctorious became the first person in more than 4500 years to apply quantitative temperature to the study of humans.

Fahrenheit (who died in 1736) used 0 (zero) for the coldest measurements and 100 for man, though it was subsequently refined to 32 and 98.6, respectively. Celsius used 0 for boiling water and 100 for freezing, and established a decimal scale of measurement. This scale was reversed several years later.

One-hundred years went by before the introduction of the mercury-in-glass thermometer to medicine. The specific standards of measurement identified at that time were based on the works of Dr. Carl Wunderlich, a German physician, and remain unchanged in medical protocol to this day.

The mouth has probably been used more often than any other site for temperature measurement. It may be convenient, but it is not the best indicator of the condition of the human thermal system. A well-positioned, controlled sublingual (under-tongue) measurement may adequately reflect core body temperature in steady state conditions, but there is a response lag in the presence of thermal dynamics. Additionally, the oral temperature will always be somewhat lower than a true core temperature since the proximity to the breathing passages will continuously cool the oral area. In fact, it has been clearly demonstrated that simply initiating faster breathing will considerably lower oral temperature.

Historically, rectal temperature has been the most relied upon method because it is not subject to the cooling effects of respiration, ambient temperature, or unreliable patient compliance. However, comparative studies have clearly demonstrated that there is a gross time lag of up to an hour or more regarding the true physiologic condition of the patient. Unless taken under steady state conditions, clinical data suggests that rectal temperature should be viewed as highly questionable.

The temperature of the skin is normally substantially lower than that of internal tissue and depends not only on the metabolic state of the individual, but also on various factors such as thermal conduction from heat sources within the body, vascular activity within and just beneath the surface, heat loss due to evaporation, convection by air currents, or exchange of infra-red energy to the surroundings. The skin is not an accurate measurement of core temperature because of environmental dependency, and the local state of vascularized skin areas such as the forehead have been shown to produce errors of 2 to 7 degrees Fahrenheit.

Logically situated at the base of the brain, the hypothalamus contains the coordinating center for the various processes of temperature regulation. It can be considered the main thermostat for any mammal. But unlike our home thermostat, the hypothalamus cannot ordinarily turn off the heat, it only initiates responses to

protect the body from a build-up or loss of heat. Its posterior section is concerned with heat retention and production, while the anterior part is concerned with heat loss.

Proximal to the hypothalamus is the tympanic membrane (ear drum), and as it is perfused by the same blood supply as the hypothalamus, reflects the same temperature as the hypothalamus.

Thirty-two years ago, Drs. T. Hannes and Maria Benzinger, in Bethesda, MD, firmly established tympanic temperature as the optimum temperature measurement for use in the diagnostic evaluation of man. Unfortunately, the technology did not exist at that time for non-invasive instruments with which to measure the temperature of the tympanic membrane in a safe and accurate manner. It has been only recently that advances in infra-red technology have led to the development of such an instrument.

The test data shows that under thermal and metabolically quiescent conditions, all of the standard temperature measuring sites are essentially the same. However, under conditions of thermal and/or metabolic stress, such as encountered in rapid changes in fever, high muscle activity, hyperthermia, or hypothermia, tympanic provides the best diagnostic temperature.

The infra-red method is fundamentally different from other methods of temperature measurement. To measure any temperature, heat must be transferred from the object to be measured to the measuring device. Conduction and radiation are the basic methods of transferring heat and measuring temperature. Conduction is the basic method employed when any probe-type device is used. Radiation is the basic method employed by an infra-red sensor. The infra-red instrument is like an eye, and simply looks at the heat radiation emitting from the tympanic membrane. Because the tympanic scanner is an optical instrument, it is not necessary to ever touch the membrane.

The Exergen Corporation manufactures the OTOTEMP 3000, an infra-red tympanic temperature scanner. It comes in a rugged Special Duty Model that works within an ambient temperature range of 0 to 145 degrees F. If carried inside your clothing prior to use, it will work down to temperatures of at least 60 degrees below zero. Suggested retail price is $799. Life expectancy of the device is seven years. Order from or get more information from:

Exergen Corporation
One Bridge Street
Newton, MA 02158
(800)422-3006.

(Adapted from: Core Body Temperature via the Tympanic Membrane, by Marybeth Ryan and Francesco Pompei, 1990.) **

"Appendicitis?"

(continued from page 7)

Vomiting, nausea, and anorexia. A few hours after the initial pain, the patient will generally experience nausea or vomiting. Severe vomiting and nausea may be taken as signs of a severely distended and inflamed appendix.

Local tenderness. Once the general pain has subsided and localized pain has begun, localized tenderness may develop. (Pain is something the patient feels, but tenderness is the discomfort you provoke by touching the area.) You may palpate, gently, using the middle of the fingers of one hand, the lower right abdominal quadrant. Tenderness might be present either when you push down or allow the abdomen to rebound.

Fever. This may not be present at the beginning of the attack but may develop within the first 24 hours. A gradually rising temperature that does not rise more than 2 to 3 degrees total is likely with appendicitis.

The order of appearance of the symptoms will, almost invariably in an appendicitis, occur in the order they've been presented here: 1. Pain, usually epigastric or umbilical. 2. Anorexia, nausea, or vomiting. 3. Tenderness--somewhere in the abdomen or pelvis. 4. Fever.

Vomiting before the onset of pain, for example, is almost always indicative of some other ailment. Other signs and symptoms may occur but because of their infrequency are not listed as part of the four major findings. These include: rigidity and or distention of the abdominal wall, hypersensitivity to touch in the region, and constipation.

Many, though not all, cases of appendicitis will result in a perforation, or rupture, usually 48 hours or more after onset of the symptoms. When this happens, the early findings will continue and worsen. Over time peritonitis will develop. Its signs and symptoms include pain, vomiting, muscular rigidity, anxiety, and ultimately, elevated temperature, the cessation of intestinal activity (no bowel sounds), distention, and toxic shock.

Keep the patient emotionally calm, still, and comfortable. If dehydration is a problem, and if rapid evacuation is impossible, administer clear liquids in small sips.

Above all remember that a little knowledge can be a dangerous thing! Even experts with access to sophisticated equipment can misdiagnose the source of abdominal distress. Use this information to help identify an appendicitis early on. Record a detailed history and seek professional medical help if you suspect any major abdominal irregularity.

(This article was adapted from *Cope's Early Diagnosis of the Acute Abdomen*, 18th ed., revised by William Silen, New York: Oxford University Press, 1991.) **

WMN Dispatches

Colorado Altitude Research Institute

Since the founding of the Colorado Altitude Research Institute in 1988, CARI has made steady progress toward its goal of becoming the preeminent center in the country for the study of the effects of altitude. CARI is dedicated to research, education, and medical care of the effects of moderate and high altitude.

CARI has published an altitude awareness brochure. Hundreds have been distributed. An editorial on the treatment of high altitude pulmonary edema (HAPE), written by CARI research committee members Dr. Brownie Schoene and Dr. Jack Reeves, appeared in the October 31, 1991 issue of the **New England Journal of Medicine**. An account of the treatment of acute mountain sickness (AMS) with the Gamov bag was published in the **Annals of Emergency Medicine** by a group of CARI researchers (Kasic, Yaron, Nicholas, Licktieg, and Roach. **Ann Emerg Med** 20:1109-1112, 1991.)

Please write if you would like copies of these publications or more information about CARI, Box 38, Keystone, CO 80435, (303) 262-1114.

Wilderness First Aid Kits: What's New?

Having been originally produced in 1905 hardly qualifies the ingredients of New-Skin as a "new" consideration for you wilderness first aid kit, but I just discovered it . . . and I wonder what that says about me. Available in liquid, spray, or tub e, New-Skin dries rapidly to form a bandage that is mildly antiseptic, flexible, and waterproof, yet it keeps out germs while it lets skin breathe. Clean the injured area, apply the bandage, let it harden. If you want a thicker bandage, apply a second coat of New-Skin after the first one dries. Joints (knees, elbows, knuckles) should be kept bent until the bandage hardens.

New-Skin is 83.3% esters, volatile solvents similar to what you find in nail polish products, which means 1) keep it away from your plastic products until it dries, and 2) it's flammable. Since it's a solvent, New-Skin can be removed simply by applying more of it, and rubbing it all off before it dries. It is 2.1% plasticizer, a cellulose derivative, and 7.1% ethanol, which means it'll sting a bit if the skin is open. New-Skin is 1.0% 8-hydroxyquinoline, an antimicrobial agent, and 1.0% Oil of Clove, a local anesthetic and counter-irritant.

I was introduced to New-Skin by Morgan Hite (who divides his time instructing for the National Outdoor Leadership School and the Wilderness Medicine Institute) who showed me how he prevents and treats blisters in the field. Morgan prefers the small bottle of liquid bandage" with the applicator built in, and, now, so do I. New-Skin meets one of my basic first aid kit requirements of multi-use capabilities, working also as protection for small cuts and abrasions while they heal, as a preventive measure against the formation of callouses, and as a protective cover for painful hang nails. And, in a desperate moment, you could always use it to get your campfire going.

If you have any questions about any of the New Skin family of products, please write to: Consumer Relations, Medtech Laboratories, Inc., P.O. Box 1108, Jackson, Wy 83001, or call, outside Wyoming at 1-800-443-4908. or in Wyoming at 307-733-1680.

Wilderness Medical Society Moves

The Wilderness Medical Society has a new mailing address. You can now write to the WMS at P.O. Box 2463, Indianapolis, Indiana, 46202, or call them at (317) 631-1745.

High Altitude Research in Bolivia

The Department of Anesthesiology at the Maryland Institute for Emergency Medical Services Systems is sponsoring a biomedical expedition to Bolivia, May 16 - 31. We are seeking subjects to participate for five days in high altitude research. The main focus of the studies is measuring cerebral blood flow and function in a high altitude environment.. Post research options include mountain climbing and canoeing in the Amazon Basin.

Total cost is $1,900 from Miami and is tax deductible. For more information, please contact Dr. Bernhard at (410) 328-2628.

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Wesley Crain
P.O. Box 550
Charlestown, NH 03603-0550
Or call: (603) 826-4301

The Wilderness Medicine Newsletter, Inc.

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ISSN 1059-6518

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The *Wilderness Medicine Newsletter* is published six times a year: January/February, March/April, May/June, July/August, September/October, November/December. Subscription rates are: $20 for a year, $37 for two years. Back issues are available upon request.

Correspondence should be sent to: *Wilderness Medicine Newsletter*, 1208 St. Francis Road, Bel Air, Maryland, 21014. Questions and comments are welcomed.

The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

May/June 1992 Volume 3, Number 3

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Drugs In The Wilderness

By Buck Tilton

Here lies the basic problem: the doctor lives far away. It may be hours, even days, until the nearest medical facility opens its doors to your patient. But time looms as the critical factor separating your patient from morbidity, perhaps mortality.

With all care there exists windows of opportunity, therapeutic time frames in which some aid must be started to produce the best effect. If that care calls for drug therapy, the wise wilderness provider carries a complete understanding of the indications, mechanisms of action (MOA), contraindications, side effects, and dosages of available drugs.

Note: Only a few recommendations concerning many available drugs are included in this article. Consult your physician before carrying any prescription drugs in your wilderness first aid kit.

Analgesics: Killers of Pain

Acetaminophen [Tylenol (Reg.), Anacin II (Reg.)]

Indications: pain relief and fever reduction

MOA: weakly inhibits prostaglandin synthesis (prostaglandins are believed to be mediators of pain, fever, swelling, and redness)

(Continued on page 2)

"Drugs in the Wilderness"

(continued from page 1)

Contraindications: known allergy, liver disease

Side Effects: infrequent hypersensitivity

Dosage: 325 to 600 mg orally every 4 hours, not to exceed 4000 mg per day

Comments: excellent non-prescription substitute for aspirin for mild to moderate pain and fever, but has relatively little effect on inflammation.

Aspirin [Bayer (Reg.)]

Active Ingredient: acetasalicylic acid

Indications: pain relief, fever reduction, anti-inflammation

MOA: weakly inhibits prostaglandin synthesis

Contraindications: known allergy, head injury, bleeding wounds, severe asthma

Side Effects: gastric irritation, hypersensitivity (especially in children)

Dosage: 325 - 600 mg orally every 4 hours

Comments: non-prescription, for 4 to 7 days after an injury, even one aspirin may increase blood loss; overdoses may cause ringing in ears, dizziness, confusion, lethargy, nausea, and vomiting

Ibuprofen [Advil (Reg.), Motrin (Reg.), Nuprin (Reg.)]

Active Ingredient: ibuprofen

Indications: pain relief, fever reduction, anti-inflammation

MOA: inhibition of prostaglandin synthesis

Contraindications: known hypersensitivity, ulcer patients

Side Effects: gastric irritation

Dosage: 200 to 800 mg orally every 4-6 hours, with food

Comments: excellent non-prescription relief for musculoskeletal pain, menstrual pain, dental pain, and frostbite pain

Percocet (Reg.)

Active Ingredients: oxycodone hydrochloride (5 mg) and acetaminophen (325 mg)

Indications: severe pain

MOA: oxycodone is an opioid that binds to receptors in central nervous system

Contraindications: head injury, respiratory difficulty, hypersensitivity, ETOH

Side Effects: respiratory depression, nausea, vomiting, constipation, stupor, euphoria, increased intracranial pressure

Dosage: one tablet orally every 4-8 hours

Comments: a prescription schedule II narcotic with abuse potential, dependence liability similar to morphine, use only with patients in severe pain who are being evacuated

Tylenol III (Reg.)

Active Ingredients: codeine (30 mg) and acetaminophen (300 mg) (Note: Tylenol II contains mg codeine and Tylenol IV contains 60 mg)

Dosage: One to three tables orally every 4 hours

Comments: see Percocet; helps relieve serious coughing, reduces fever

Vicodin (Reg.)

Active Ingredients: hydrocodone bitartrate (5 mg) and acetaminophen (500 mg)

Comments: see Percocet; may be better for severe musculoskeletal pain

Antihistamines

Benadryl (Reg.)

Active Ingredient: diphenhydramine

Indications: allergic reactions, including itching, sedation, mild anti-emetic (for vomiting), mild anti-vertigo (for motion sickness)

MOA: prevents release of histamines and other inflammatory mediators

Contraindications: known allergy, asthma, glaucoma, cystitis

Side Effects: CNS sedation, including drowsiness, dry mouth, constipation, gastric upset, and unrinary retention in older males

Dosage: 25 to 50 mg orally every 2-8 hours

Comments: non-prescription, can be used after epinephrine in treatment of anaphylaxis, may reduce symptoms of common cold

Epinephrine [Ana-Kit (Reg.), Epipen (Reg.)]

Active Ingredient: epinephrine

Indications: anaphylaxis

MOA: increases blood pressure, decreases swelling of upper airway and skin, relaxes bronchial smooth muscle, increases heart rate, inhibits release of mediators

Contraindications: none if true anaphylaxis exists

Side Effects: anxiety, tremors, fast heart rate

Dosage: adults, 0.3 cc injected in upper arm or thigh, subcutaneously

Comments: prescription only; multiple injections may be required with no definite endpoint; Benadryl may be used as an adjunct, steroids may be used (if available); patient should be evacuated

Anti-inflammatories

See Ibuprofen and Aspirin

Anti-emetics

Compazine (Reg.)

Active Ingredient: prochlorperazine

Indications: nausea and vomiting

MOA: reduces impulses to vomiting center

Contraindications: hypersensitivity to this or any other phenothiazines (e.g. Haldol, Thorazine)

Side Effects: drowsiness, dizziness, amenorrhea, dry mouth, constipation, gastric upset, urine retention

Dosage: 10 mg orally every 6 hours, or 25 mg suppository every 6-8 hours

Comments: phenothiazines (e.g. Compazine, Haldol, Thorazine) are capable of producing dystonic reactions (muscle spasms of neck and face, and spasms of eyes), in which case patients should be reassured and treated with Benadryl; migraine headaches have often been successfully treated with Compazine

Anti-diarrhea Medications

Kaopectate (Reg.)

Indications: mild to moderate diarrhea

MOA: unknown

Contraindications: known hypersensitivity

Side Effects: constipation

Dosage: Two tablets at onset of diarrhea, two more after each bowel movement, not to exceed 14 tablets in 24 hours

Comments: one of several non-prescription meds, seems to work for most people

Imodium (Reg.)

Active Ingredient: loperamide hydrochloride

Indications: diarrhea

MOA: unclear, seems to limit peristalsis

Contraindications: none

Side effects: constipation, CNS depression may occur with overdose

Dosage: 4 mg orally to start followed by 2 mg after each bowel movement, maximum of 16 mg per day

Comments: non-prescription; in cases of acute diarrhea discontinue use after 48 hours if there is no improvement, and evacuate the patient

Lomotil (Reg.)

Active Ingredient: diphenozylate

Indications: severe diarrhea

MOA: limits involuntary intestinal muscle activity

Contraindications: known hypersensitivity

Side Effects: constipation, nausea, CNS depression, including drowsiness and dizziness, itching

Dosage: One tablet after loose stool up to 4 - 6 per day

Comments: prescription only; synthetic narcotic, may be abused; if no effect on diarrhea is notices after 24 hours on Lomotil, evacuation of the patient is advised

Anti-biotics

Bactrim (Reg.)

Active Ingredient: trimethoprim/sulfamethoxazole

Indications: urinary tract infections, traveler's diarrhea

MOA: inhibits genetic bacterial replication

Contraindications: known hypersensitivity to sulfa drugs, pregnancy, blood disorders

Side Effects: rash, sore throat, fever, gastric upset, headache, Stevens-Johnson syndrome

Dosage: One double-strength tablet orally every 12 hours for 5 days, for 10-14 days if fever or flank pain develops with UTI; some recommend to use for 3 days for mild UTI, some recommend to use for 10 days to avoid the 5% recurrence rate on a short (5-day) course

Comments: prescription only, as with all anti-biotics continue for minimum number of days, evacuation if patient shows no improvement, in 1 - 2 days

Bactroban (Reg.)

Active Ingredient: mupirocin

Indications: skin infections

MOA: inhibits bacterial protein synthesis

Contraindications: known hypersensitivity

Side Effects: burning, stinging, itching

Dosage: apply thin layer to affected area three times per day

(continued on page 4)

"Drugs in the Wilderness"

(continued from page 3)

Comments: prescription only; a topical anti-biotic; if no improvement in 3 days, or if infection spreads, patient should be evacuated or treated with oral antibiotics

Cipro (Reg.)

Active Ingredient: ciprofloxacin

Indications: infections of skin, lower respiratory tract, urinary tract, blood, bones, joints, and gastrointestinal tract

MOA: inhibits bacterial protein synthesis

Contraindications: known hypersensitivity, this medication is for adults only--it can cause premature closure of the growth plates

Side Effects: gastric upset, rash

Dosage: 250 to 500 mg orally every 12 hours, with food

Comments: prescription only; in a recent study ciprofloxacin was as effective as IV anti-biotics, tolerated by almost all people, especially effective against gastrointestinal infections, relatively new, probable drug of choice for traveler's diarrhea

Erythromycin

Active Ingredient: erythromycin

Indications: infections of the mouth, pharynx, sinus, respiratory tract, and ear

MOA: inhibits bacterial protein synthesis

Contraindications: known hypersensitivity

Side Effects: gastric upset, although newer forms are less irritating

Dosage: 250 to 500 mg orally every 6 hours with food for at least 5 days, up to two weeks for respiratory, ear, and sinus infections

Comments: prescription only; very safe broad spectrum anti-biotic; preferred alternative to penicillin in allergic individuals; drug of choice for respiratory infections of head and neck

Keflex (Reg.)

Active Ingredient: cephalexin monohydrate

Indications: infections of skin, wounds, bones, and urinary tract, second line drug for infections of respiratory tract and gastrointestinal tract

MOA: inhibits bacterial protein synthesis

Contraindications: known hypersensitivity, those allergic to penicillin (10% cross reaction)

Side Effects: rash, infrequent diarrhea

Dosage: 250 to 500 mg orally every 6 hours, continue for at least 5 days

Comments: prescription only; broad spectrum first generation cephalosporin, first choice for skin, soft tissue, and urinary tract infections (unless Bactrim is available for urinary tract infections)

Silvadene (Reg.)

Active Ingredient: silver sulfadiazine

Indications: to treat or prevent burn wound infections

MOA: inhibits protein synthesis, silver has bacteriostatic properties

Contraindications: previous sulfa drug reactions; facial burns

Side Effects: rash, itching, burning

Dosage: following cleansing of the wound, this topical agent is applied sterilely to a thickness of 1-3 mm 1 to 2 times per day until wound drys

Vaginal Yeast Infection Medications

Monistat (Reg.)

Active Ingredient: miconazole nitrate

Indications: anti-fungal for vaginal infections

MOA: affects fungal permeability

Contraindications: local hypersensitivity

Side Effects: local irritation, burning, itching

Dosage: Monistat 3 (Reg.) - 200 mg suppositories nightly for 3 nights, or Monistat 7 (Reg.) - 100 mg suppositories for 7 nights, or the topical cream as needed

Decongestants

Sudafed (Reg.)

Active Ingredient: pseudoephrine hydrochloride

Indications: decongestant for upper airway, sinus, and nose

MOA: constricts dilated blood vessels, reducing swollen tissue

Contraindications: known hypersensitivity (rare), heart disease, diabetes, and hyperthyroidism

Side Effects: tremors, nervousness, insomnia

Dosage: 30 - 60 mg orally every 6-8 hours

Comments: causes less drowiness than antihistamines

Afrin (Reg.)

Active Ingredient: oxymetazoline hydrochloride

Indications: nasal congestion, may be used with antibiotics for treating sinus and middle-ear infections

MOA: shrinks swollen membranes

Contraindications: known hypersensitivity, heart disease, diabetes

Side Effects: tremors, restlessness, nervousness

Dosage: spray up each nostril twice each day

Comments: use for more than 5 days may cause reverse effects, sharing of spray may cause sharing of infection, more than two times per day use may cause rebound congestion

Steroids

The steroids are relatively new emergency drugs and, as such, deserve a few words of introduction. Adrenocorticosteroids, or just corticosteroids, are manufactured from cholesterol by the adrenal cortex, a gland constantly involved in homeostasis (the maintenance of normal body functions). There are two basic types of corticosteroids: mineralocorticoids, which regulate water and electrolytes in the blood, and glucocorticoids, which regulate carbohydrate metabolism.

Of the many forms of synthetic steroids available, only three are used in emergency medicine: hydrocortisone, methylprednisolone, and dexamethasone. These drugs have primarily a glucocorticoid effect on the human body. They are most effective against vasogenic edema, which means simplistically, that badly damaged brains and spinal cords have a longer life expectancy if steroids can be administered in time after the injury.

Most of the adverse effects of steroids relates to their accentuation of normal physiological effects, especially suppression of the normal activity of the adrenal gland. But use of steroids for less than a few weeks does not lead to significant adrenal gland suppression (Emergency, September 1991, **Steroids: Drugs of a New Age?**, Brian J. O'Neil, MD).

Dexamethasone [Decadron (Reg.)]

Active Ingredient: dexamethasone

Indications: treatment of high altitude cerebral edema (HACE), severe acute mountain sickness, and increasing intracranial pressure from a head injury

MOA: exerts strong anti-inflammatory effect on mediators of inflammation, capillary permeability (leading to cerebral edema), and an immune response.

Contraindications: no absolute contraindications

Side Effects: personality and behavioral changes, gastric upset, muscle weakness, complicates diabetes

Dosage: 8 mg orally to start, then 4 mg every 6 hours during evacuation

Comments: not a substitute for descent in severe altitude illnesses, no need to taper therapy over short term, can also be used as an adjunct to epinephrine in severe cases of anaphylaxis

More Altitude Medicine

Diamox (Reg.)

Active Ingredient: acetazolamide sodium

Indications: moderate to severe acute mountain sickness

MOA: causes a bicarbonate diuresis which prevents fluid retention, stimulates breathing, and decreases hypoxia during sleep

Contraindications: sulfa allergies, pregnancy, renal disease, dehydration

Side Effects: numbness and tingling in the lips, fingers and toes, and gastric upset

Dosage: 250 mg orally every 6-12 hours

Comments: can prevent or diminish symptoms of mountain sickness in many people; diuretic effect can cause dehydration; drink often while taking **

Wilderness Professional Training Courses

Wilderness Professional Training (WPT) provides training and consulting services in wilderness medicine, rescue, and risk management. Steve Lyons, NREMT-P manages their emergency medicine programs from Crested Butte, Colorado. For more information on the following courses call or write P.O. Box 86, Crested Butte, CO 81224, (303) 349-5939, voice mail 1-800-347-2133 ext. 4703.

Wilderness emphasis EMT refresher:
Aug. 31 - Sept. 11

Wilderness First Responder: Sept. 16 - Sept. 25

Wilderness EMT: Oct. 5 - Oct. 30

Physician River Medicine and Rescue: Costa Rica, 10 days, early Nov.

Wilderness First Aid: Dec. 2 - Dec. 4

Wilderness First Aid: Dec 8. - Dec. 11

Wilderness Drug Tips

- A side effect of a drug is something that might happen, but does not change the intended use of the drug. Watch for it, but do not be alarmed by it.
- A contraindication implies an adverse effect of the drug, a reason to not give it.
- When you take that bottle of pills out of your first aid kit, check that all pills are the same color and shape. Different pills in the same bottle usually indicates you have different drugs in the same bottle. Be sure of what you're giving the patient.
- Label all drugs carefully, including expiration dates. Put clear tape over the label to ensure the drug's name stays with the bottle. And double-check that the name on the bottle is the name of the drug you want.
- Before giving a drug, ask patients if they are currently taking any drugs. As a general rule, prescription drugs should not be mixed without a physician's advice.
- Ask patients if they are currently using drugs of abuse. They often don't consider recreational drugs, including alcohol, as "medications." As a general rule, recreational drugs and prescription drugs should not be mixed without a physician's advice.
- When patients claim an allergy to a drug, ask patients to describe their reaction. Mild reactions may be worth the risk in long-term situations.
- Before giving a drug, ask patients specifically about medical problems, such as heart disease, diabetes, seizures, hypertension, asthma, and psychiatric disorders.
- Remember sustained-release drugs may become a problem long after they are taken.
- Be sure that drugs to be swallowed are swallowed, drugs to be chewed are chewed, drugs to be dissolved first are dissolved first, and suppositories are suppositoried.

Note: If students or clients on wilderness trips are carrying drugs you should, 1) Know it, and 2) Know about the drug.

Traditional Medicinals: Alternative Drug Therapies

By Buck Tilton

Since the beginning, herbs have played an important role in the development of medicine. Long before their use as beverage teas, herbs were used for the treatment and prevention of illness. In fact, up until the turn of the century, herbs still provided the basic ingredients for most medicines. When, through modern chemistry, drugs began to be synthesized, many of the simple ways of traditional medicine were left behind.

Today, over 30 percent of our modern drugs still come from plant sources. And interest in natural remedies is once again on the rise. The most popular of these are the medicinal herbs, probably the oldest of natural remedies. Herbs can be potent sources of drugs.

Some of the herb teas available today are strong enough to be required to comply with the Federal Drug Administration's demands for over-the-counter (OTC) drug products. One of the first companies in this country to market OTC medicinal herb teas was Traditional Medicinals (Reg.) Their Breathe Easy (Reg.) tea, for example, is a remedy for hay fever, colds, and allergies. The active ingredient comes from the leaf of the Ephedra, whose alkaloid, ephedrine, dilates the lungs, so it is useful in relieving symptoms of congestion. Sudafed (Reg.), a popular chemical decongestant, contains the active ingredient pseudoephedrine (false, or synthesized ephedrine).

Traditional Medicinals (Reg.) guarantees safe and effective natural medicines in OTC tamper-resistant boxes, and they offer a variety of teas, including Cold Care (Reg.), Smooth Move (Reg.), and Herba-Fed (Reg.) Please address your inquiries, feedback, and comments to: Traditional Medicinals, 4515 Ross Road, Sebastopol, CA 95472.

(Editor's Note: WMN is planning a future issue on natural remedies. We are interested in your questions, experiences, information, and comments.) **

Activated Charcoal Update

By Buck Tilton

Syrup of ipecac use has been reduced by nearly 50 percent since 1983 and, during the same time period, use of activated charcoal (AC) has increased by over 50 percent. There are two reasons: 1) the safety and efficacy of activated charcoal has been proven, and 2) commercially-made pre-mixed activated charcoal slurries have made administration quick and easy.

You will remember being taught to give a single dose of AC after the patient's stomach was emptied by ipecac-induced vomiting. Several recent reports have concluded that the sole use of AC is superior to stomach emptying procedures, and some experts are calling for the abandonment of the traditional use of ipecac (Annals of Emergency Medicine 19:6, June 1990, American Journal of Emergency Medicine 9:144-146, 1991, Clinical Toxicology Forum, Vol 2 No 5).

[Editor's Note: See WMN Volume 2, #6, "Ipecac? Gack!" and Volume 3, #1, "Letters to the Editor" for more of the story.]

Although AC is pharmacologically inert, use is not totally without danger. The number of cases of adverse reactions are limited, and judicious use of AC can eliminate almost all the problems. The problems are bronchospasm and airway occlusion due to aspiration of the charcoal. Judicious use calls for 1) aggressive shaking of the AC slurry prior to administration to break up any clumps, and 2) aggressive airway management after administration, especially in children. It also may be advantageous to give the AC in small doses instead of all at once.

Another factor is of importance to the wilderness care provider: not all AC solutions are created equal. In an independent test of the five leading solutions (Krenzelok and Lush, Am J Emerg Med, 9:144-146, 1991), only one solution remained significantly re-suspendable after storage of 3 to 12 months. The others settled and caked to the sides of the container. After sitting in your first aid kit, you want an AC solution that you can trust to work. Only the AC in Actidose Aqua (Reg.) remained viable, with 95 percent delivered to the patient, even after prolonged storage.

Actidose Aqua is also available with sorbitol, added to make a veritably yucky solution more palatable. Sorbitol, additionally, produces a cathartic (laxative) effect, beneficial since some patients report post-AC constipation. On the down side, sorbitol increases the risk of vomiting, although not greatly.

Actidose Aqua is available from: Paddock Laboratories, Inc., 3101 Louisiana Avenue North, Minneapolis, MN 55427, or call: 800-328-5113. (Note: I've had the Actidose Aqua leak into my first aid kit. It still works, but I recommend packing it in a separate plastic bag for neatness.) **

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Why Vapor Barrier?

by Jack Stephenson

Confusion Reigns?

During the 1950's, mountain hiking and backpacking became more popular. In rain, people wore their usual rain wear, which worked well in other conditions, but, combined with strenuous activity, caused them to overheat and get wet with sweat. Most stopped the overheat by wearing less clothes under their rain wear. A few blamed the rain wear for their overheat, ignoring their usual method to correct overheat by removing extra clothes. Knowing that the coated rainwear was warmer than open weave fabric, they started a quest for colder "breathable" rainwear.

Most rain wear and sailing foul weather gear is made of coated nonporous fabric. (Even Goretex is only about 1/10 as porous as uncoated fabric and most people say Goretex makes a jacket warm, not cool.) Most people know that rain gear provides a lot of warmth if it is kept tightly sealed so wind can't blow through! Most ski parkas, storm overpants, and skimobile suits have a coating on the hidden inner surface of the outer fabric because coating works so well for warmth and waterproofness. Sealed fabric is warmer because it won't let cold air blow through to remove heat and it retains some humidity to reduce evaporative chilling of your skin. This tends to confuse some people: your skin can feel dry and yet have high evaporative heat loss. Insensible sweat glands keep your skin moist for flexibility, even when cold.

We're told that "breathability" to make rainwear cold will also make clothing warm. But, the slight porosity of "breathable" rainwear doesn't prevent overheat when active, while highly porous clothes lose a lot of heat through convection and evaporation. The "B" myth is a typical but dangerous mental reversal. It defies all logic, yet writers believe it just because they've seen it repeated so often in ads.

The Problem: Defined

When cold air is warmed to your skin temperature the relative humidity next to your skin approaches zero. This causes rapid evaporative chilling of your skin. When insensible sweating can't keep up with the excessive drying, your skin gets dry and chapped. For example, when it is 32 deg. F outside, evaporative chilling can make it feel 22 deg. colder. (At lower temperatures there is only a small increase in evaporative heat loss, since 32 deg. air is almost as dry as any colder air - cold air just can't hold much humidity.)

Your body constantly produces and loses heat. If heat loss matches production, you stay comfortable. If you are comfortable (clothed or unclothed), and then increase heat production, you'll overheat. Your body responds with sensible sweating, to increase cooling by evaporation of sweat. If you lower the air temperature -or remove or vent clothing, you soon cool, sensible sweating stops, and your skin is soon dry. But, even then, as long as the relative humidity in the air next to your skin is less than 100 percent, moisture in your skin will continue to evaporate, cooling and drying your skin excessively. If humidity next to your skin reaches 100 percent (meaning it can't hold any more water vapor), evaporation stops, chilling stops, and insensible sweating stops. A humid summer day feels much hotter than a day with the same temperature and low humidity. Rain acts as a dehumidifier and THAT is what makes a rainy day feel much colder than an equal temperature, sunny, dry (but humid) day.

If that was all there were to the problem, simply adding more clothes (and using moisturizing skin creams) should take care of it, and that works fine for short periods of cold exposure. But usually the outside relative humidity is 100 percent, so the air can't accept more humidity, and, thus, most of the moisture evaporated from your skin condenses in the outer layers of your clothes.

If you sweat from overheat, your skin gets wet and the sweat wicks into and soaks your clothing without cooling you more because the air can't accept more humidity. That sweat only destroys the insulation of your clothes and chills you later when you need warmth! Wicking may keep the sweat "comfortably" away from your skin so you won't notice it, but that delays the intelligent action of venting or removing excess clothing to stop the overheat. Then, when you finally slow down or stop, and need your insulation, you find it is wet, and worse than having no insulation. Before you die of hypothermia from believing those false ads claiming their insulation is warm when wet, I suggest you soak your jacket in a tub of water, shake it out and wear it to experience just how cold it really will be!

Most of this isn't a problem if you're going outside for short periods, or not changing activity level greatly. But for someone jogging, cross-country skiing, or hiking it can be a very serious, dangerous matter. Is there a solution? YES!!

The Solution: Vapor Barrier

Vapor barrier insulation has been used in homes for over 80 years, and in clothing since 1944. It took about 45 years for builders to recognize that vapor barriers in structures are essential. The argument was that they needed porous walls to dry out water found in them, ignoring the fact that it was the porosity that let water

vapor in to condense. Thus, it's not too surprising to hear almost the same argument today against vapor barrier in clothing! The other argument is actually optimistic: They expect vapor barrier to **always** overheat you because high humidity contributes to summer overheat! Wouldn't it be nice if we could get all needed warmth simply by controlling humidity?! Unfortunately, we can only get up to 22 deg. added warmth from humidity retention with VB.

It has been reported that a person loses about four pounds of water through sweat and respiration during a night of sleep in dry winter weather when using a "breathable" sleeping bag. Weighing of porous sleeping bags in the morning usually shows two to four pounds weight increase, confirming that statement, and also showing that the sweat doesn't make it out of the bag. Instead, it condenses in the insulation, leaving the bag wet. It takes 1080 BTU of heat from you to evaporate one lb. of sweat. It also takes 140 BTU to melt one lb. of ice. Thus, the heat to evaporate four lbs. of sweat will melt 30.85 lbs. of ice! (4 x 1080 = 30.85) Would you want to take 30.85 lbs. of ICE to bed with you? That's the effect you get by not using vapor barrier interior in your sleeping bag.

If you lose four lbs. of water during eight hours of sleep, you can expect to lose much more during 16 hours you are aware and active. That's a lot of dehydration and heat loss, and can lead to serious impairment of circulation due to thickened blood, increasing risk of frostbite. You know that warm, humid conditions decrease evaporative losses and you can create that warm, humid condition around your body all day with VAPOR BARRIER clothing.

We normally tolerate overheat until we are bothered with wet skin from sensible sweat. Then, we ventilate or remove excess clothing or, if nude, seek cooler location, a breeze, or cool water. If our clothing is absorptive, it gets very wet long before we notice the overheat, and then it may take a LONG time to dry, which in winter can lead to hypothermia. If clothing isn't absorptive (Vapor Barrier) we notice sweat from overheat almost immediately, so can then vent or remove excess insulation. Thus, our insulating clothes stay dry and ready to protect us when needed. The vapor barrier preserves the insulating value of all our clothes, as well as keeping us up to 22 deg. warmer when kept snugly closed!

During short-term changes in activity level at work in a protected environment, it's nice to have clothing that soaks up sweat from overheat so we can ignore it (until washday). For that we don't like nonwicking polyester or acrylic fiber against us, even though it's very "breathable." A Vapor Barrier fabric with very wickable nylon inner surface is much more comfortable, since it rapidly distributes local sweat over a large area so it is not annoying: you'll notice and correct for overheat, but wicking distribution soon eliminates the wet feel. Thus, modern wickable surface Vapor Barrier materials, such as Stephensons FUZZY STUFF are more acceptable than the old coated VB (Vapor Barrier) fabrics.

What Do Users Say?

How do users of VB react? Generally with orders for more VB clothing and sleeping bags, and recommendations to their friends. Since 1967 we've sold about 8000 VB lined sleeping bags, and only about one out of 400 customers object to having to consciously adjust insulation, preferring to just let their insulation soak up their sweat, and drink more to make up for fluid losses. But even they agree that VB is good for extra warmth and insulation protection when it's below freezing. We've found many of those people have low metabolisms, need more insulation to stay warm, and thus NEED VB the most! No matter what their metabolism is, the extra heat produced from activity is the same, and thus the person who wears thicker clothes for warmth when inactive will sweat more when active due to those excessive clothes. To stay dry they must adjust clothes more. VB underwear helps them notice the need to adjust, and keeps all outer clothes dry even if they fail to control sweating.

What About Sleeping?

When you are awake and active it is easy to adjust insulation to avoid overheat without venting VB clothing. When asleep, the normal reaction to overheat is to push covers away. With VB built into a bag, pushing the top open to cool reduces the extra warmth of the VB while still maintaining protection from condensation in the bag. (Sleeping bags rarely get wet from outside, but bags without VB interior almost ALWAYS get very wet from inside from condensation and sweat.) If you wear VB clothing in the bag, the automatic response doesn't defeat the added warmth, so temperature control will be no better (or worse) than in non VB bag, but you will protect the bag.

VB in a sleeping bag causes no added warmth when vented, and always protects the insulation from condensation and sweat soaking, thus it's advisable to have VB in your bag for all seasons. The fast surface wickability of Stephensons FUZZY STUFF makes it especially desirable for hot summer use when you're lying nude and overheated, using the bottom only.

The most common excuse we hear from manufacturers and salespersons for not selling VB lined bags and VB clothing is that they don't want to take the time to explain it to their customers. Mighty inconsiderate, I think!

Other Benefits

VB clothing has other unexpected benefits:

1. Elimination of condensation in your tent. People who regularly over dress and rely on wickable clothing to carry away sweat, add much more humidity to a tent.

(continued on page 10)

"Vapor Barriers"

(continued from page 9)

If you have to change shirts due to sweat odors in less than four days, you will also likely cause excessive condensation in any tent you use. Wearing a VB shirt can help you recognize and correct overheat.

2. Elimination of sweat odors on clothing and yourself. It's obvious how outer clothing is protected. Apparently quick sensing, and thus avoidance of sweating, plus blocking of air circulation that causes sweat to turn rancid, reduces or eliminates sweat odors on you and the VB clothing, as well.

3. Prevents dehydration, and thus reduces the amount of water you must obtain and drink. Dehydration is a major contributor to frostbite, hypothermia, and altitude sickness. It thickens your blood, impairs circulation (thus decreases proper heat and oxygen distribution), and reduces oxygen intake. It's especially difficult to drink enough fluids when not wearing VB clothes and ALL your water must come from melting snow! In several days the weight of fuel saved due to use of VB can greatly exceed the weight of the VB clothing.

4. When you start with VB you can then wear any kind of material for outer layers, no matter how uncomfortable or impractical it might be otherwise, since you'll have no concern with it getting wet. Your outer windbreak layer can be any coated or laminated fabric, preferably not "breathable" so you don't have to be concerned with dirt causing it to leak. When weight is a consideration, chose your intermediate layers solely on the basis of most thickness per pound. Use the lightest urethane coated Nylon rain wear for outer windbreaker, or wear ski parka and ski storm overpants with urethane coated outer layer and polyester fiberfill insulation, which is typically the lightest practical insulation per inch for clothing. Good Goose Down is much lighter, but weight of extra fabric used normally more than offsets the reduced insulation weight. Only in the very thick insulation needed for sleeping bags is the great advantage of Goose Down really important.

Jack Stephenson has been advocating the use of and selling vapor barrier clothing for years. Some seasoned outdoor veterans are sold on the idea; some researchers and other folks are still skeptical; many have no opinion at all. If you would like to learn more and try VB's yourself, you can get a catalog with a complete line of VB clothing from Mr. Stephenson by sending $1.00 to RFD 4, Box 145, 22 Hook Road, Gilford, NH 03246. Let the WMN know what you think. **

More on Vapor Barriers

Dr. Murray Hamlet is one of the researchers who has disagreed with Jack Stephenson over the years about the value of vapor barrier clothing. The questions are complicated, and the WMN has recently spent time corresponding with both gentlemen in an attempt to sort the issues out. Among the things we learned was that once we cleared up some semantical differences, their opinions did not differ as dramatically as we first thought they might. At any rate, the following letter from Dr. Hamlet represents another perspective on VB clothing. We hope others will contribute their opinions during the next several months. We'll be conducting our own limited research next winter.

Dear Editor:

. . . . Sweating is produced by a neurogenically mediated sweat organ that produces salty water. It is modulated by high temperature and in certain areas of the body by emotional stress. There are different kinds of sweat glands.

The water loss from skin which has historically been called insensible sweat should probably not be called that. It is, I believe, a passive process related to the skin cuticle, waxes in the epidermis, the rate of replacement of water in the skin from beneath. The vapor pressure (relative humidity at the skin interface) removes water from the skin depending on the vapor pressure gradient.

I have only minimal doubt that vapor barrier can decrease insensible water loss. They will probably prevent it by raising the vapor pressure to equal the skin vapor pressure.

The big question is on standard sweating. When you are sedentary, VB is no problem and may be comfortable. When you start to work, however, what happens is temperature rises, sweat glands are stimulated to produce sweat to increase evaporative cooling. Do vapor barriers change this process? Are there studies to show that sweat decreases with vapor barriers? I doubt it. The major engineering problem with chemical protective MOPP 4 clothing is the excessive heat load and tremendous amount of sweat which ends up in the gloves and shoes of these garments. They are rather loosely fitting garments and maybe a closer fit with less airspace would make a difference, but I have not seen any studies that would address this point.

Any water leaving the skin surface, sensible or insensible, is going to have impact on the clothing insulation. Temperature gradients and moisture in the cold will

produce evaporation and condensation throughout the clothing layers.

I have never said that vapor barriers are not useful in sedentary individuals, they decrease insensible water loss and they buy time between changing outer layers. It is when one works that I need proof of efficacy in function. Do they stop sweating? Where does it go? How do they modify thermal regulation? I have a feeling that VB wearers walk a tightrope between activity, sweating, insulation, and ventilation.

The bottom line is if vapor barriers are so good, why have they not gained more visibility, user acceptance, and overall use in the cold weather clothing setting?

Sincerely,

Murray P. Hamlet, D.V.C.
Director, Research Programs and Operations Division, U.S. Army Research Institute of Environmental Medicine
Natick, Massachusetts

In a phone interview with Dr. Hamlet, he told the WMN that he believes some of the sweat that is trapped inside VB clothing is re-absorbed by the body. The process, called myohydromiosis, does not re-absorb sweat as fast as it comes to the skin surface, but may be responsible for helping the body retain some moisture. Dr. Hamlet left us with these final thoughts: 1) the degree of benefit is variable from individual to individual; 2) everyone could probably benefit from vapor barriers on the feet; 3) if you are hanging around, full VB protection is probably good for most people; 4) if you are wearing VB, attempt to keep sweating to a minimum (don't over insulate) 5) more lab work needs to be done with VB before researchers will feel comfortable making definitive statements. **

The Wilderness Medicine Newsletter, Inc.

Copyright, Wilderness Medicine Newsletter, 1992
ISSN 1059-6518

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The *Wilderness Medicine Newsletter* is published six times a year: January/February, March/April, May/June, July/August, September/October, November/December. Subscription rates are: $20 for a year, $37 for two years. Back issues are available upon request.

Correspondence should be sent to: *Wilderness Medicine Newsletter*, P.O. Box 1102, Bel Air, Maryland, 21014. Questions and comments are welcomed.

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

July/August 1992 Volume 3, Number 4

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WMN Update

The WMN is moving! Ken Thompson, WMN's Managing Editor, and Carolyn Thompson, Production Editor, are moving from Bel Air, Maryland to Albuquerque, New Mexico in order to follow their hearts and pursue their respective vocations. While both Ken and Carolyn will continue in their WMN positions, we will now be conducting business in the office of the:

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Call us at (303) 641-3572. Do not be concerned if you have recently sent us mail; the Bel Air, Maryland address will be maintained for many months to come.

The fine illustrations in this issue are the work of free-lance artist Tom Pergola. If you would like to talk to Tom about drawings you might need, you can reach him at 4934-7 Columbia Road, Columbia, Maryland 21044.

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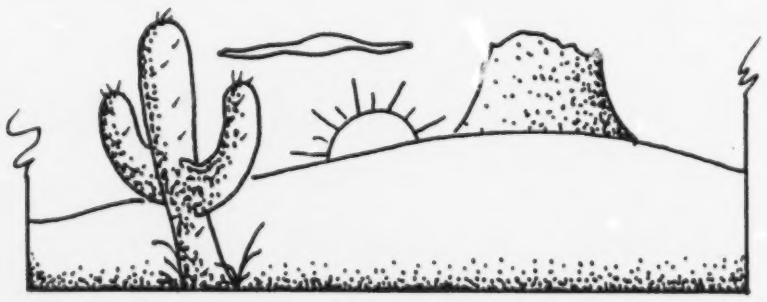


The Ankle Can Rankle

By Buck Tilton

Ah, the injury-prone ankle. Which active outdoorsperson hasn't sprained an ankle? Ankle sprains account for 53 percent of all evacuations (due to injury) from National Outdoor Leadership School (NOLS) courses. Interestingly, 85 percent of all ankle sprains involve only the lateral (outside) ligaments. Many of these injuries can be managed in the field, without an evacuation.

Basic Anatomy

The lower leg's large tibia and smaller fibula meet the ankle at the talus, an upwardly rounded bone that allows the tib and fib to "rock" on its top. The talus, in turn, "rocks" on top of the calcaneus (heel bone). This ability to rock allows for freedom of movement when the human body hikes, climbs, or runs.

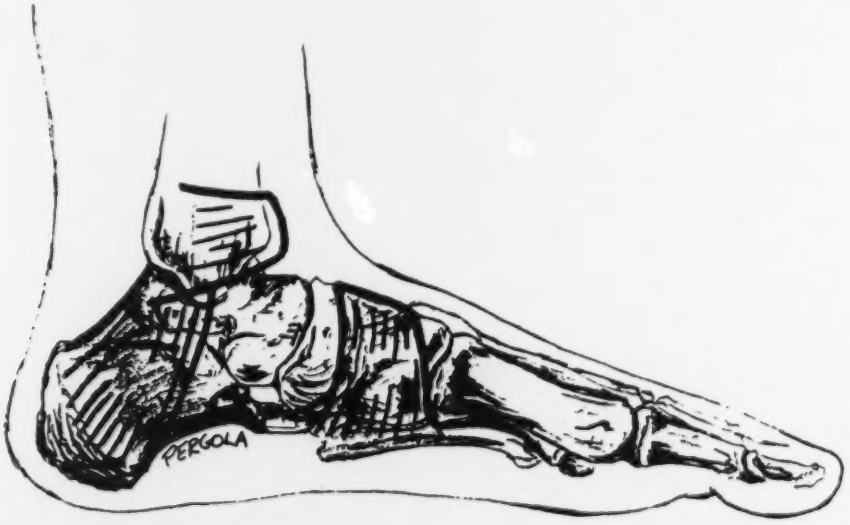
In front of the calcaneus lies two small bones, the navicular on the medial aspect (inside) of the foot, and the cuboid on the lateral aspect. In front of these two bones are three even-smaller bones called the cuniforms, for a total of seven "ankle bones." In front of the cuniforms are the five metatarsals (foot bones) that connect to the phalanges (toe bones).

It takes a complex arrangement of ligaments to hold all those bones together! But six of these ligaments are primary targets for injury. Two of these, the anterior (front) and posterior (rear) tibio-fibular ligaments, hold the tib and fib together, preventing those bones from being wedged apart by the talus when you take a step. Number three, the deltoid ligament, attaches the tibia to bones on the inside of the ankle. The deltoid is wide and tough, allows little eversion of the ankle (a roll to the outside), and is rarely sprained. In fact, twisting of the deltoid is more likely to pull off a fragment of bone (an avulsion fracture) than to sprain the ligament. On the outside of the ankle, the other three primary ligaments attach the fibula to the talus and the calcaneus: the anterior and posterior talo-fibulars, and the calcaneo-fibular. These smaller, weaker lateral ligaments allow much more inversion than the deltoid allows eversion and, consequently, they are the ones most often damaged.

Assessment

Ankle assessment is relatively simple:

- Start with the basic historical questions: What happened? How far did the ankle twist? Which way? Was there a sound at the moment of stress on the ankle (other than a yell from the patient)?
- Look at the ankle. Is there swelling? Discoloration?



- Feel the ankle. Is there pain when you press on location of underlying ligaments?
- Move the ankle passively through it's range of motion. When you stress the ligaments gently, do they hurt? Do you hear a grinding sound?

Degree of pain and loss of range of motion are the primary indicators of ankle injury!

Management

All ankle injuries should be managed initially with adequate RICE-ing. Monitor the ankle post-RICE for swelling and discoloration, the degree of which will help determine the extent of injury. In the end, the patient will be the best determiner of usability. Mild ankle injuries can be taped (see pages 4 and 5) and the patient will be able to stay in the field. Moderate injuries can be taped to allow the patient to limp out of the field, probably with most of the weight from his or her pack distributed among other group members. Severe ankle damage will require splinting and, most likely, carrying of the patient out to definitive medical care.

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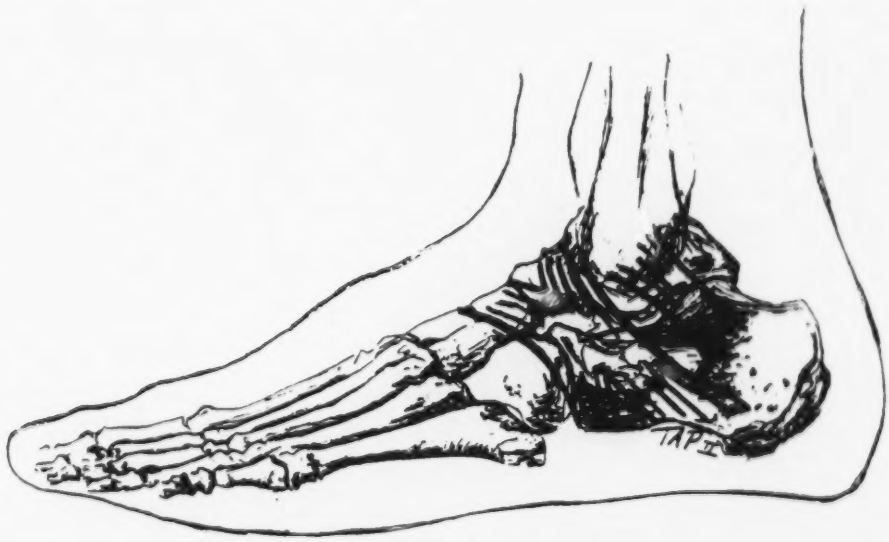

Taping

An Ankle

Sprains damage the supportive structures in the ankle. A good taping job may provide enough stability and support for a patient to walk out on her or his own. The sequence below outlines an easy-to-learn general purpose wrap.

Getting Started

- Since 85% of all injuries involve only the lateral (outside) ligaments, our drawings and instructions explain which direction to wrap the tape to treat that type of sprain. However, the same wrap can be applied to sprains of the medial ligaments by reversing the direction you pull the tape in drawings 3, 4, and 5. The principle is simple: **when wrapping tape under the arch, wrap in the direction that allows you to pull up towards the injured side.**
- You will need one role of 1 inch athletic tape and, probably, a safety razor. Angled bandage scissors are handy for removing the finished wrap.
- Adequate preparation increases the chance of a successful job. Make sure the lower leg is clean, dry, and clean-shaven midway up the calf. If you have it, an application of tincture of benzoin will make the tape stick better. (To practice without shaving, wrap the ankle with "pre-wrap".)
- Position the foot at a 90 degree angle relative to the leg and keep it in that position until the wrap is complete.
- As you apply each strip of tape, overlap the previous application a little bit. Your goal is to encase nearly the entire ankle and foot (except for the heel and toes) in tape.
- Neatness counts. Avoid wrinkles and creases. Allow the tape to follow natural contours of the body.
- Pull firm pressure on the tape as you wrap. The tape will stretch out a bit as the patient walks. So, it should feel a bit tight immediately after you have finished.
- As you would do with any splint, periodically check for good circulation, sensation, and motion distal to the wrap.

1

2

3

4

Step one

Wrap tape once around the leg several inches above the malleoli, but below the calf muscle. Allow it to overlap itself about and inch and tear it from the roll. This first strip is called the "anchor" (drawing 1).

Step two

Tear a piece of tape long enough to reach from the anchor on one side, down the leg, under the arch, and up to the anchor on the other side of the leg. Place the center of this strip under the arch, align one running end over each malleolus, pull both ends firmly toward the knee and stick those ends to the sides of the leg, being sure to overlap the anchor. Immediately apply another anchor slightly below the first, so that it secures the tape you just applied. This is called a "stirrup" (drawing 2). Repeat step two.

Step three

Apply a "J-loop" by beginning on the medial aspect of the leg at the same point as the beginning of the stirrup. Wrap down the leg, under the arch, and up over the instep until you can overlap the downstroke of the J about an inch, then tear the tape. Secure the top of the "J" with an anchor. Repeat step three. (Drawing 3 illustrates the beginning of this step, seen from the lateral aspect; drawing 4 illustrates two completed "J-loops" seen from the medial aspect. For clarity, stirrups have been omitted from drawing 3.)

5

Step four

This time start under the arch. Wrap the tape up and over the lateral ligaments, across the instep, and behind the ankle. Continuing with the same strip, bring the tape back across the instep and down over the medial aspect. Finish where you began, under the arch. This is a "figure-of-eight" (drawing 5). Repeat step four.

Step five:

To create a "heel-lock", begin at the arch. Wrap up and over the medial aspect and around the heel. Pull tape directly forward, over the instep and back to where you started (drawing 6). Repeat step five.

6

Step six

You should be left with some tape on the role and with some exposed patches of skin. In any artistic way you like, cover those patches so that only the heel itself and the toes remain open. Any other patches that you leave open will be highly susceptible to uncomfortable rubbing and to friction blisters. Check circulation, sensation, and movement. Then have the patient check for usability. If he or she seems able, it is time to head back to the trailhead. Some adjustment and periodic re-taping may be necessary.

Knees: The Joints Most Needy

by Buck Tilton

After 40 years of wearing a heavy backpack into remote areas, slipping and sliding on steep terrain in search of adventure and solitude, and attempting to hone my perennially-dull backcountry skiing edge, I've noticed, more and more, my knees ache at the end of the day...and, sometimes, before the day has ended. Diagnosis: worn out parts. Cause: abuse and overuse. Cure: well...

I have become another of the numberless victims of the human body's most vulnerable joint. No other of the body's 187 bone-to-bone connections causes as many problems.

To take care of a knee, it is, perhaps, best to start with an understanding of its construction and function. If your car fails to run properly, you need some basic auto mechanics in order to decide, 1) Is it OK to keep driving it? 2) Are there things I can do to make it work better? and, 3) Does it need a car doctor? Same goes for the human body.

The knee comprises three bones: the femur (thigh), the tibia (which we touch when we say "shin"), and the patella (kneecap). Another bone, the fibula, attaches behind the tibia, near the knee, but has no specific influence on the joint.

Femurs and tibias articulate, or rub against each other, when legs are in motion. The articulating surfaces of the femur and tibia are semi-flat and, to ensure a secure fit, each knee is padded with two C-shaped pieces of cartilage, one on the outer half of joint space, the other on the inner half. They, also, absorb some of the shock of movement. They are called the medial (inside) meniscus and the lateral (outside) meniscus. Placed strategically in the knee are fluid-filled sacks, called bursae, at points of the greatest friction.

The knee is held together by ligaments - four of them. They are attached at the points of highest stress. Connecting the femur to the tibia are the medial and lateral collateral ligaments, on the, of course, inside and outside of the knee. They provide stability for side-to-side motion. For back-to-front and front-to-back stability, there are the cruciate (crossed) ligaments. They run through the joint space, between the two menisci. Both cruciate ligaments attach on their upper end to the femur, and on their lower end to the tibia, and they are named for where they attach to the tibia. The anterior (front) cruciate ligament (ACL) attaches to the femur at the back of the knee and to the tibia in front, thus preventing the knee from sliding too far forward. The posterior (rear) cruciate ligament (PCL) attaches to the femur at the front of the knee and the tibia at the rear, thus preventing the knee from sliding too far backwards. Ligaments are made of connective tissue in which there is very, very little elasticity. There is no functioning of the knee without the cruciates.

When in motion, the great muscles of the leg provide additional support to the knee. The quadricep (thigh) muscles are a group of four muscles. They taper down into one tendon that crosses the knee and attaches to the top of the tibia. The patella lives in the middle of this tendon. Three muscles in the back of the leg, the hamstrings, also help support the knee. One attaches to the outside of the knee and the other two to the inside. The calf muscle (gastrocnemius) attaches in two places to the back of the femur and, finally, a long thin muscle runs from the groin to the inside of the knee, adding a touch more support.

In addition, a long tough tendon, called the ilio-tibial band, runs from your gluteals, the muscles of your hindquarters, down the thigh, across the knee, attaching to the outside of the tibia. This band, too, gives a bit of support.

You'd think, with all that support, the knee would last longer. Unfortunately, the fittings are only moderately snug, the demands put on the joint are great, and it is highly susceptible to trauma or overuse.

Any force applied to the knee can partially or totally sever a ligament (a sprain) - a serious injury. If the force is applied to the outside of the knee, the medial collateral ligament and anterior cruciate ligament may be involved - as well as the medial cartilage. If the force is applied to the inside of the knee, the lateral collateral could be torn and lateral cartilage may be ruptured. Twisting forces may significantly damage the cruciate ligaments.

The most common source of knee pain is overuse of the muscles that support the knee. When they are stressed too much, they tear (a strain) and create a great deal of discomfort. They most often strain near their attachment to the knee. Tendonitis, an inflammation of the tendons, has the same mechanism. Muscle strains and tendonitis are commonly mistaken by the patient as a torn ligament or cartilage. This mistake is very common when the ilio-tibial band is involved. Since the band is required for uphill motion, it is often abused when someone is not used to going uphill, or increases their uphill activity, especially if they're wearing a pack. The problem, called ilio-tibial band syndrome, causes pain primarily where the band attaches to the outside of the knee, simulating a torn collateral ligament.

General knee pain may have other causes, including patellar compression syndrome," a problem created by too much pressure on the back of the kneecap by too much walking, especially downhill. A dull ache, constant and nagging, is the common complaint. Or, perhaps, your kneecap doesn't run quite correctly in its track. The additional side-to-side motion of the kneecap puts additional stress on its inner surface, which eventually causes pain for up to several hours after use. If the pain becomes chronic, never going away, your condition may be chondromalacia of the patella. Chondromalacia refers to a disintegration of the cartilage under the kneecap, probably caused by a chemical change stimulated by knee injury or overuse. The cartilage becomes frayed and eroded. Interestingly, the cartilage can't hurt, since it has no nerve endings. So, the pain must come from inflamed tissue around the cartilage.

Assessing the Knee

1. Take a History.

First, you need to assess the extent of the damage. In medicine, we call step one of assessment a "history." Did the pain start as the result of trauma (a forceful blow or twist) or overuse? If it was trauma, was there a direct blow to the knee? Which way was the knee forced to

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Knees . . .

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move? Did it twist? Was the foot planted when the force struck? Did you hear any sounds, such as a popping noise? If it was overuse, have you ever had this kind of knee pain before? Does it hurt all the time or just when you move? In both cases it is beneficial to ask, "Have you ever had pain like this before?" If the pain came on suddenly from trauma, especially if it made funny noises, and if it hurts most of the time, you need to see a doctor.

2. Visually Inspect.

Take a look at the knees. Do both knees look the same? Damaged knees may show swelling, discoloration, or some other obvious deformity, such as a kneecap in the wrong place. The more a knee swells, and the more discolored it is, and the funnier it looks, the more it needs a doctor.

3. Palpate.

Touch the hurt knee with your fingers, probing gently. Do you find specific points of pain? Are the painful places over ligaments or tendons? Does it hurt when you push down on the kneecap, or wiggle it side-to-side? Is there pain along the line where the tibia and femur meet? The more specific pain in the knee is, the more likely there has been damage that needs repair.

4. Check Range of Motion.

Can you flex and extend the knee through its full range of motion? Or does it lock up or get too painful to move past a certain point? Knees with a loss of range of motion should be taken to a doctor.

5. Check Laxity.

Each of the four ligaments holding the tibia to the femur can be individually assessed. These tests should be done with the patient sitting down and the leg relaxed. If the patient is unable to tolerate these checks, their knee needs a doctor.

The medial collateral ligament, the one on the inside of the leg, can be checked by holding the ankle, with the knee slightly bent, and pushing from the outside of the knee in. If it's loose or painful, stop pushing.

The lateral collateral ligament, on the outside of the leg, can be checked in the exact opposite way, pushing from the inside of the knee out. Again, looseness or pain is a sign to stop pushing.

The anterior cruciate ligament, one of two "crossed" ligaments inside the knee joint, can be checked by bending the knee slightly and pulling out on the tibia while pushing back on the femur. Watch for pain and looseness.

Posterior cruciate damage, which happens in only about one percent of all knee injuries, can be checked simply by lifting the relaxed leg by the ankle and letting the knee sag.

6. Test for Function.

This simple test should not be done until at least one hour after pain starts. If the patient can stand and walk, do halfway deep knee bends, and jump up and down on each knee individually, it is probably fine to keep using those knees.

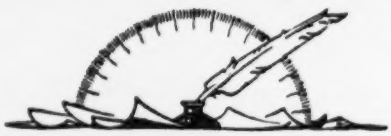
Treatment

If the knee has been traumatized to the point where it can't be used, the leg should be splinted, with the knee slightly flexed, and the patient should be carried to a doctor. If the knee can be used carefully, you can build a cylinder splint, one that wraps securely around the joint but does not let the knee move, and the patient can limp to a doctor. Cylinder splints should, also, hold the knee in a slightly flexed position. If the knee is painful but usable, apply RICE several times a day until the pain is gone. RICE is Rest, Ice, Compression, and Elevation. Rest means get off the joint. Ice means cool the joint with ice, snow, chemical cold packs, or cold water. (Note: ice, snow, or cold packs should not be put directly on naked skin.) Compression means wrap the knee in an elastic wrap, but not too tightly. Elevation means keep the knee higher than the patient's heart. RICE should be applied for 20 to 30 minutes, then taken off. Three or four times each day should be enough. In addition, over-the-counter anti-inflammatory drugs (aspirin, ibuprofen) should ease pain and may speed healing. These drugs should be taken with food.

Overuse injuries can be treated the same as traumatic injuries. If an overuse injury is bad enough to splint, it should be taken to a doctor. RICE and anti-inflammatory drugs may ease pain and speed healing. Gentle massage and mild stretching exercises often make the knee feel better and mend quicker.

Any knee that fails to respond to your treatment should be taken to a doctor. Sometimes surgery is required to make it all better. **

Letter to the Editor



A Breathable Response

Dear Editor:

I read with great interest the two articles regarding vapor barrier systems in the Wilderness Medicine Newsletter (V3n3). As an advocate of breathable systems for winter travel, I am always interested in the techniques and technologies of that which I choose not to emulate. In addition to increasing my knowledge of the topic, the more I know of the science and opinions of opposing perspectives, the more I generally learn about my own views. It is this continuous re-evaluation of data and opinion that helps all of us think more clearly and accurately.

There are some things I should state before the following discussion. I believe VB systems work, and they work better for outings of shorter duration, than longer. Ice climbers on day trips are perhaps the most extreme VB users, with a smattering of campers who are out for relatively short periods of two weeks or less. I don't know enough long term travelers who use such systems for comments beyond that.

Another observation has to do with the native peoples of the north. The Inuit have had water-proof clothing for thousands of years, yet their winter gear is always breathable. The Indians of the boreal forests likewise have a system of winter clothing that is also breathable. A fundamental difference in perspective exists already. The native people were traditionally at home and living in the environment. Modern campers and travelers are visitors to the wild areas that are not their homes, and this is true psychologically as well as physically. Hence some travelers have an adversarial relationship with the wilderness they purport to love. Much of the clothing, tools, and techniques of the modern camper inhibit engagement, understanding, and cooperation within the wild environments. This estrangement from natural life appears in perfect metaphorical form in the materials of our equipment. Synthetic fibers and vapor barriers encapsulate this most clearly.

Interesting as holistic philosophical elements may be, it is the VB issue on a practical level that I wish to address here. The questions raised by Dr. Murray Hamlet in the last two paragraphs of his letter are precisely the most revealing and necessary to answer. They are precisely the missing links which I would most like to see described, and my disappointment in their absence is boundless.

I am not a fan of VB systems personally. I regard the strategies and methods for effective use of them as far too fussy to be practical on the trail. My patience is reserved for the landscape of the country I'm in, not the management of a complicated system fraught with inconvenience, and side-effects that may be unpleasant. Dr. Hamlet's analogy of VB users walking tightrope is a good one.

How then does breathability function? Basically you wear a layering system that allows normal transpiration to occur naturally, while keeping cool enough to pass moisture as a gas through those layers. To sweat is to get wet, and to be cold. You must thermoregulate accurately for the level of exertion. If you do, your outer layer of clothing may develop frost feathers in extreme cold. These are dry and can be brushed off. If your level of activity changes, your clothing is not wet, or even damp, which would rob you of heat. Different parts of the body lose heat at different rates, and in a breathable system these points are easily accommodated and factored for.

The type of winter travel I engage in is also very conducive to a breathable system. Winter mountaineering and other extreme forms of outings may not be. My travels are by snowshoe and hauling toboggan in the boreal north, using the frozen waterways as the thoroughfares for travel. It is this element that creates the whole package aspect of the system. The means of travel allows for luxuries, such as a light Egyptian cotton wall tent and a trail woodstove. Since the waterways are the routes of travel, an ice chisel provides access to enormous amounts of water with which to keep hydrated, as well as do the laundry, cooking, and bathing.

The layers are these: Next to skin, fine woolen long Johns. Wool Pants. Any combination of a light, medium, and heavy wool shirt, depending on insulation needs. If it is windy, an anorak and wind-pants of the

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A Breathable Response

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same Egyptian cotton that the tent is made of. Wool hat, goggles, scarves, and wool mittens with light leather shells complete the covering, with the exception of the feet, which I will treat separately. For lunch break or an emergency stop, a down parka is kept in a stuff sack on the toboggan for easy access.

On the feet when it is lower than + 25 deg. F, we wear a wool sock or two at skin level, a duffel cloth bootie or snowmobile boot felt liner, and a soft leather and canvas moccasin. As your transpire moisture with different levels of exertion it all passes through the layers as a gas, and at worst a little frost will build up on the outside of the duffle or felt liner. This is easily brushed off and dried in the tent at night. No one's feet have ever been cold on any of our winter trips, including people with poor circulation and even Raynaud's Syndrome. Should the ambient temperature rise high enough for the snow to get damp, or for compression to warm it to wetness (body weight of a person at about + 25 deg. F), we wear soft rubber booties which, of course, don't breath, but at these "warm" temperatures activity will keep feet warm despite damp sock layers.

For sleeping, we favor down bags. They breath the best, compact the smallest, retain loft the longest given hard use, and are the best in all respects. The moisture build-up from normal transpiration is easily handled in a tent with sheet steel stove in it. Bags are dried each morning while breakfast is being prepared. The tents are kept at about 70 or 80 degrees while the stoves are going, and the ridgeline where the bulk of the drying takes place is about 120 deg. F while the stove is going. The tent itself is breathable also, as all those people breathing in them, cooking in them, and washing dishes, laundry, or themselves create an enormous amount of vapor which must condense as frost outside, where it can be brushed away. On layover days or in fine weather when camp is pitched early, sleeping bags will be hung in the air to air out, fluff up, and perhaps sublimate a small amount of moisture away.

In short, a breathable system is the easiest to manage in the field with a minimum of care and knowledge, allows the normal functioning of transpiration to take place, does not require any special procedures to function well, and lends itself best to the normal routines of life and doings while on the trail.

Vapor barrier systems require constant fussing with, often rely on synthetic fibers which break down in the sun or function poorly in extreme cold, are prone to abrasion when used hard, and hold body odors with a vengeance that the most diligent laundering cannot subdue. On top of this, many are petroleum based fibers, which means their origins may have environmental compromises in their manufacture and production. Many present a serious burn hazard to people wearing them around stoves, or drying them near a heat source where the loss of the garment might occur with sudden finality.

Natural fibers, on the other hand, don't seem to burn that fast if they fall onto a stove, are repairable and patchable and darnable beyond belief, don't hold body odors so well, are easily laundered, function when dirty, and decompose into patching material for other newer garments as they age, rather than becoming a landfill problem. Finely woven wool is very abrasion resistant, and the sun and rapid extremes of temperature don't seem to influence it in any way.

The above is base on ethnographic and historical data, as well as empirical evidence. I choose not to use the vapor barrier systems after observing the trials and tribulations experienced by those who have or do use them. Given the conditions of use in appropriate areas, I see no reason to experiment beyond the consummate comfort already available to me. Mountaineers and winter backpackers are already choosing a terrain which may favor VB systems, not everywhere is it appropriate to heat with fire and wood, and of course some situations lack the luxury of easy access to water, and adequate hydration is absolutely essential to avoiding a multiplicity of problems that find their extreme form in death by hypothermia.

For the past 12 years, Alexandra and I have led numerous winter trips in Maine, Quebec, and Labrador. Our guests have never suffered an emergency or even mild inconvenience. One memorable and euphoric trip was a 60-day traverse of the Ungava Peninsula in temperatures that saw a low of -58 deg. F. In all cases we have basked in a comfort so total and stunning that all our energies could be devoted to the pleasures of the trail and living in a magnificent landscape.

I hope there are many more responses to the WMN query on this subject, for as Dr. Hamlet observes, the hardest and best questions are yet to be illuminated. We will all benefit wonderfully from all sides of the vapor barrier issue as more experience is revealed.

Sincerely,
Garrett Conover

(Garrett and Alexandra Conover guide much-acclaimed wilderness trips in the north country. You can reach them at North Woods Ways, RR 2, Box 159-A, Willimantic, Guilford, Maine 04443, (207) 997-3723.)

Wilderness Medicine Institute Bag

By Melissa Gray, Wilderness Medicine Institute and Outdoor Leader at Large

The Wilderness Medicine Institute, Inc. and Atwater Carey, Ltd. now produce a first aid kit designed for outdoor guides and trip leaders.

Until recently I've always been a "build your own kit and get what you really need" kind of person. I was also under the misconception that this was the cheapest way to go. So, being opinionated and unbelieving, I broke The WMI Bag down piece-by-piece and tried to do it cheaper by myself. (There was also a bet involved, in which they would give me a free Bag if I succeeded.) I shopped at Walmart, the local drugstore, and the Indiana Camp Supply and Campmor catalogs.

The WMI Bag contains three modules: Tools, Injury Management, and Non-Prescription Medications. The tool section includes trauma shears, tweezers, safety pins, a scalpel, hyperthermia thermometer, sphygmomanometer, stethoscope, and a mouth-to-mouth breather. My retail cost: $64.14.

The Injury Management Module includes latex gloves, Bloodstopper (Reg.) trauma dressings, an irrigation syringe, povidone-iodine, anesthetic pads, a sterile scrub brush, steri-strips (Reg.), tincture of benzoin, Second Skin (Reg.), moleskin, bacitracin, assorted Bandaids (Reg.), sterile gauze and non-stick gauze pads, conforming roll gauze, Tegaderm (Reg.), athletic tape, an elastic wrap, a flexible wire splint, a Sawyer Extractor (Reg.), and an emergency space blanket. My retail cost: $100.74 (minus the irrigation syringe, which I couldn't find).

The Non-prescription Medication module includes ibuprofen, Benadryl (Reg.), Pepto-Bismol (Reg.), oral rehydration packets, Aloe Vera gel, Afrin (Reg.) nasal spray, Mylanta II (Reg.), Tinactin (Reg.), sunscreen SPF 20, hydrocortisone cream, and povidone-iodine ointment. My retail cost: $30.55.

The WMI Bag contents are packaged in various sized resealable bags inside a red renovated camera belt pack. The kit rides easily on your fanny or clipped to the outside of your backpack, and, as an added bonus, I found the inside divider to be a serviceable cervical collar or padding for splints. There is some extra room for additional items that you can't live without. My retail cost: $48.00 (Campmor Catalog)

My total retail cost was an alarming $243.43!

The WMI Bag is sold for $145.00, so, needless to say, I not only lost the bet but I was forced into public humiliation by being coerced into writing this article. For more information on the WMI Bag write the Wilderness Medicine Institute, P.O. Box 9, Pitkin, CO (303.641.3572) or Atwater Carey, Ltd. 218 Gold Run, Boulder, CO 80302 (800-359-1646).

The Wilderness Medicine Newsletter, Inc.

Copyright, Wilderness Medicine Newsletter, 1992
ISSN 1059-6518

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The *Wilderness Medicine Newsletter* is published six times a year: January/February, March/April, May/June, July/August, September/October, November/December. Subscription rates are: $20 for a year, $37 for two years. Back issues are available upon request.

Correspondence should be sent to: *Wilderness Medicine Newsletter*, P.O. Box 9, Pitkin, Colorado 81241. Questions and comments are welcomed.

The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

Printed on recycled paper

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Some of WMI's 1992-93 Offerings:

Wilderness EMT

- Nov 24 - Dec 18, Kelly, WY $800 tuition only or $1225 with room and meals at the Teton Science School [to register for this course, call TSS at (307) 733-4765].
- Jan 4 - Jan 29, Pitkin, CO $675 tuition only at the historic Pitkin Hotel, call WMI for information on reasonable lodging and meal rates at the hotel.

Wilderness First Responder

- Feb 1 - Feb 14, Santa Fe, NM $350 tuition only or $750 with room and meals.

NOLS Wilderness First Responder

[Call the National Outdoor Leadership School, (307) 332-6973 for registration and course details]

- Sept 7 - Sept 18, Lander, WY $600
- Feb 15 - Feb 26, Lander, WY $600

SOLO Seminars:

Wilderness First Responder, $675* (10 days)

- Sept 28 - Oct 9 (SOLO)
- Oct 26 - Nov 6 (AMC, NH 603-447-2721)
- Dec 12 - 21 (Hulbert, VT)

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- Jan 4 - Jan 29 (SOLO)

Wilderness/Rural EMT Module, $365* (for those currently certified as EMT's)

- Sept 21 - Sept 25 (SOLO)
- Dec 28 - Jan 1 (SOLO)

Advanced Leadership and Emergency Care (ALEC), $1325*

- Nov 24 - Dec 28 (SOLO)

A new program that combines First Responder and Winter Emergency Care certifications with advanced backcountry leadership skills. Loaded with hands-on field work.

*Residential courses include lodging, meals, all instructional materials, textbooks, and examination and certification fees. Costs may vary for courses at sites other than SOLO. For more information, contact: **SOLO, RFD 1, Box 163, Tasker Hill, Conway, New Hampshire, 03818. Or call: (603) 447-6711.**

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

September/October 1992 Volume 3, Number 5

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WMN Update

In the last WMN we announced that part of the WMN staff was moving to New Mexico. That move is taking much longer than anticipated and has resulted in some WMN records being divided by nearly a continent. Between one and two percent of readers have let us know that a mistake was made in billing or some other business. Please understand that we remain committed to serving you as well as we are able during this tough transition. In that regard we will continue mailing the newsletter to everyone, even if your subscription has lapsed, until we can catch up with our record-keeping. We appreciate your patience and encourage you to keep in touch. If we err (and, being human, we will) we want it to be in your favor.

When is a Psychological Assessment Necessary?

This information was presented by Gary Faris, MA at the NOLS 1992 Outdoor Educator's Conference and is summarized here by Melissa Gray.

Mr. Faris addressed two large and difficult questions in the field of outdoor education. First, how do you decide to evacuate a student for psychological or emotional reasons? And second, when do you approach

"Psychological Assessment"

(continued from page 1)

friends, colleagues, and employees when you think they might need outside help? To quote Mr. Faris, "I wish there were a formula for determining when someone needs help. You must make a human decision about what's good for that student and for the course."

Faris views the situation on NOLS courses as being a "perfect reflection of society; and society as having "more and more deeply troubled people". Over the past few years it has appeared that more and more instructors, with NOLS as well as other programs, have encountered these questions on courses and are seeking definitive guidelines for decision-making.

> *"I wish there were a formula for determining when someone needs help. You must make a human decision about what's good for that student and for the course."*
>
> *- Gary Faris, at 1992 Nols Conference*

Faris suggests the following approach:

Red Flag #1: Look for specific clues in combination. See laundry list below for clues.

Red Flag #2: Look for patterns in the student's behavior. One time doesn't say a lot.

Red Flag #3: Look for extremes in the student's behavior. Are they too nice or too negative?

Red Flag #4: Trust your perceptions and instincts. If you have some field experience, and something just doesn't feel right, use your "gut reaction."

Red Flag #5: Focus on the student's performance. When discussing the situation with them, you must be prepared with solid examples.

The Laundry List of Specific Cues for Students

Take note when:

- Harm to the group outweighs the advantages to a student.
- A student is dangerous to self or others.
- The student's problem exceeds your confidence in handling it.
- A student's behavior is vastly different than pre-course paperwork led you to believe.
- The student exhibits poor judgment.
- The student is disoriented, incoherent, or disassociated with reality.
- The student is overly optimistic or pessimistic and it's not reality based.
- The student is losing it on an emotional level (e.g. can't stop crying, yelling, or shaking in fear).
- The student is withdrawn or isolated, especially if the more folks try to get close the more the individual moves away.
- The student's speech is tangential or has no focus.
- The student reports that thoughts are racing and it is overwhelming trying to keep up.
- The student has quick emotional turn arounds that are not reality based.

Faris reminds us that any of the clues are significant, but they become most important when related back to the guidelines. Do your best to stay objective and if you are going to make a mistake, err on the side of caution.

Instructors having difficulty with their decision may try a few strategies. First, discuss the situation with your fellow instructors and then plan a "test drive" without the troubled student. For example, suggest that the affected student take a break from the next activity while you proceed with the remainder of the group. Try to decide, based on the new structure of the group, if it was "good" not having the student. Take care that one student is the specific root of the "problem" and you're not just dealing with a case of personality differences. Trust your instincts.

Second, go to the source. Discuss the problem directly with the troubled student. Find out what the person would like to do. When someone who wants out of course (keep in mind we're talking about the general

Take note when the person is not in control of emotions, experiences frequent mood swings, or exhibits a change in attitude for the worse.

population and not the special populations many of you work with), it is advisable to respect that wish. If the person wants to stay, try to find the motivation, but always reserve the right to make the final call.

Third, remember, "when you are thorough and safe there is no blame even if you make a poor decision." In these circumstances, documentation is your best friend.

When a Colleague Needs Help

It is often not so difficult to remain objective dealing with a student, but not so easy when you sense problems with a fellow staffer, someone with whom you share a past and future. When do you decide to intervene? How?

According to Faris we can follow the same five red flags as when working with students but the laundry list changes.

Laundry List of Specific Cues for Staff:

Take note when:

- The person tends to move from crisis to crisis.
- There appears to be no change in behavior after receiving advice.
- Regular supervision does not help performance.
- Personal problems place the program's integrity at risk.
- A noticeable change in attitude for the worse occur.
- The person covertly violates policy.
- The person is regularly tardy or absent.
- The person appears tired, distracted, lethargic.
- The quantity and quality of work decreases.
- Deadlines are missed.
- Excuses are improbable.
- Compared to previous work, there is a large gap in performance.
- The person appears trapped in a critical feedback pattern.
- The person has had recent trauma in life that he or she claims to have recovered from. Remember, behavior is more important than words.
- Mood swings are frequent.
- The person struggles for power.
- The person abuses drugs and alcohol.
- The person is defensive and tends to blame others.
- You have caught the person lying.
- The person appears burned out.
- The person is not in control of emotions.
- There is noticeable weight loss or gain.

"Do your best to stay objective, and if you are going to make a mistake, err on the side of caution."

To sum it all up, clues in combination, and unusual patterns or extremes of behavior tend to be indicative of the need for outside intervention. When giving feedback or suggestions focus on performance and give specific examples. Trust your instincts. If you think someone you care about needs more help than you can provide, talk with an objective party about it and formulate a plan. But take the risk: talk to him or her. **

Wilderness Risk Managers Meet to Share Resources

June 5, 1992, NOLS Headquarters, Lander, Wyoming - Leaders of a spectrum of wilderness education programs met to establish a committee on wilderness risk management. The coming together represents one of the first times that these professionals have gathered specifically to share resources and establish a communication network.

The group differentiated itself from existing conferences and associations by setting an agenda that involved discussion-oriented examination of current issues within the industry and each organization. The committee wants to serve as an informal think tank, providing better understanding and coordination in the outdoor education arena.

The meeting was attended by: Louis Glenn and Priscilla McClung, Outward Bound USA; Mike Fischesser, Alpine Towers; William Forgey, M.D., Wilderness Medical Society; Mark Wagstaff, Wilderness Education Association; Al Reid, Exum/Inner Asia Expeditions; Ted Wichmann, Association for Experiential Education; Alan Hale, International Safety Network; Bill Pierce, National Association for Search and Rescue; Michael Lindsey, American Mountain Guides Association; Jed Williamson, American Alpine Club; David Secunda, Outdoor Network & Outdoor Recreation Coalition of America; Reb Gregg, Jim Ratz, Tod Schimelpfenig & Molly Hampton of the National Outdoor Leadership School.

The participants created a list of critical issues which they distilled down to four issues to address during the meeting. These issues were examined at length producing the following statements:

Issue: Client and public pressures to make outdoor programs completely safe.

Ideas: We are proud of our safety records and safety management systems. We submit that wilderness adventure activities have risks that cannot be eliminated and that the public must recognize these risks before engaging in them. The following has been developed as a statement of the committee's position, and might be considered as a sample for use in literature describing such programs.

In the U.S. today the words "adventure" and "wilderness" are used in advertising a great diversity of products and services - from children's reading program to theme parks. Such frequent attempts at identification of products and experiences with "adventure" and "wilderness" devalue their real meaning in the minds and imaginations of many people and may lead to impressions that are both unrealistic and dangerous regarding actual wilderness programs.

> *"The activities that occur in real wilderness environments confront all the participants' skills and resources and include the risk of discomfort, injury, and death."*

The activities that occur in real wilderness environments confront all the participants' skills and resources and include the risk of discomfort, injury and death. Therefore, you must consider your desire for adventure, you must become informed about the nature of the program, realistic about your abilities, and accepting of the possibility of discomfort, injury, and death.

Issue: Consistency in safety information gathering.

Ideas: This committee will embark on a project to standardize some of the methods of definition and collection of safety data in outdoor programming. This will involve the examination of non-wilderness safety data gathering methods, definitions used, and methods that can provide concrete, meaningful information that will produce safer programs.

Issue: Radios and the influence of technology on wilderness programs.

Ideas: We recognize that there have been technological advances. Guides, educators, and organizations may be called upon to justify their decision to use or not use these technologies (for example, radios to effect rescues from remote areas). Organizations should become familiar with these advances and incorporate or reject their use as is appropriate for their goals and missions.

Additionally, these technological advances may have an adverse impact on wilderness resources and could become the focus of regulation. Therefore, coordination with land management agencies is an essential step in coming to terms with the use of technology in the wilderness. We intend to pursue a dialogue with the National Park Service, Forest Service, Bureau of Land Management and appropriate state and local custodians in an attempt to anticipate and guide regulation.

Issue: Rescue abilities of staff in technical areas and evacuation from remote areas.

Ideas: We recommend that organizations have plans for evacuation from all programming areas. Staff should be aware of evacuation plans and receive regular training in evacuation and rescue techniques and specific skills necessary in the environments utilized. Organizations should inform participants that evacuation or rescue can often be difficult or impossible in any wilderness area due to such factors as the nature of an injury or illness, remote locations, weather, and other natural conditions. Participants should give their informed consent to participate in programs in such areas.

Plans for 1993 Meeting Underway

The National Outdoor Leadership School (NOLS) organized and facilitated the meeting. The committee appointed Tod Schimelpfenig of NOLS chairperson and decided to meet annually and to share written communications regularly. The 1993 meeting will probably be linked with a symposium which managers from a broad spectrum of outdoor programs will be encouraged to attend. The proposed workshops include: radios and new technology, safety data-gathering, crisis communication, wilderness emergency medical and search and rescue protocols, and current technical outdoor procedures. **

Wilderness Injury and Illness: The NOLS Experience

This article is a summary of presentations by Dr. Douglas Gentile and Tod Schimelpfenig at the Winter Wilderness Medicine Meeting at Crested Butte 1991. The complete text was published in the Annals of Emergency Medicine, July 1992.

There is little published information on the epidemiology of wilderness injuries and illnesses. The National Outdoor Leadership School (NOLS), a private educational corporation that provides outdoor leadership training in remote wilderness environments, keeps a database of safety incidents. This study describes the types and severities of injuries and illnesses encountered during a variety of wilderness activities over a five year period, establishes incidence rates and examines injury and illness patterns.

Incidents were broadly categorized as injuries, illnesses and non-medical incidents. Because courses varied in length and some individuals participated in more than one course, incident rates were calculated per 1000 person-days exposure. The wide array of injuries and illnesses encountered made using an objective severity scale difficult. It was determined that the need for evacuation to a physician represented one measure of severity, and the need for an assisted evacuation, where the person could not leave the field under his or her own poser, another level of severity.

During this study NOLS students and instructors participated in 358,210 person-days of of wilderness activities. The overall rates per 1,000 person-days for injury was 2.3, for illness was 1.5, and for non-medical incidents was 0.3. There was one fatality during the study period resulting in a mortality rate of 0.28 per 100,000

(continued on page 6)

"Wilderness Injury and Illness"

(continued from page 5)

person days. Students became ill and injured more often than instructors and female students more often than male students.

Injuries

Injuries, 56% of incidents, included sprains/strains and tendon injuries (53%), soft tissue injury (27%), and fractures and dislocations (4.6%). The majority of injuries (56%) involved the lower extremities. Females experienced significantly more injuries than males only in the over-20 age group.

Illness

Sixty percent of illnesses were due to nonspecific viral syndromes or diarrhea. There were 23 incidents of Acute Mountain Sickness, 3 of anaphylaxis, and five of acute abdominal pain. Other illnesses included seizures, diabetic complications, skin rashes, epididymitis, migraine and irritable bowel syndrome. Eighteen incidents involved dental problems.

Evacuations

Evacuations was required in 43% of incidents at a rate of 1.5. Students required evacuation more often than instructors, females more often than males. Instructor decisions to evacuate for physician evaluation are often based on conservative assessment by non-physicians or projected inability to participate in the program. Only 2% (29) victims required assisted evacuations. Twenty-four of these were for injury, five for illness.

Discussion

The reported injury and illness rates demonstrate that with appropriate training and equipment, wilderness activities can be conducted relatively safely, however, the low incident rates in this study may not be generalized to other populations. This study also demonstrates that evacuations occur with sufficient frequency that the need must be anticipated in training and program planning.

Although it is difficult to compare incident rates between different populations we have examined injury rates per 100 participants for football (14.5 to 81) and gymnastics (28 to 138). NOLS rates are 7.6 injuries and 3.2 evacuations for every 100 participants. It is important to note that daily exposure time on NOLS course is much longer than that in athletic activities.

The low incidence of AMS, hypothermia, and heat illness reflects the special training NOLS staff receive in preventing and managing these illnesses. We believe that many of the viral syndromes and diarrheal illness are hygiene related. Convincing students leaving reliable modern sanitation to maintain strict hygiene practices in apparently pristine wilderness is difficult. Field observations confirm deterioration in hygiene practices during longer courses. Preventative measures implemented by NOLS as a result of this study (group cooking in some programs, chlorine rinses, aggressive hand washing, etc.) appear to have reduced the rate of hygiene-related illness.

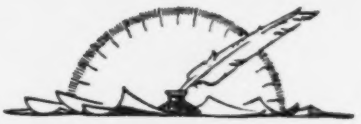
"This study demonstrates that evacuations occur with sufficient frequency that the need must be anticipated in training and program planning."

This study suggests that training for wilderness leaders should include prevention, recognition and treatment of athletic injuries, wounds, dental problems, and hygiene-related illness. To effect a substantial reduction in injury and illness rates for multi-week wilderness activities, prevention storages must focus on athletic injuries and hygiene.

The authors believe that the challenge and attractions of wilderness activities outweigh the relatively low risks reported in this study. However, defining acceptable rates of injury and illness is an individual determination and depends on the perceived benefits of the activity versus the individual's willingness to accept inherent risk. This study, by beginning to delineate the risks of wilderness activities, provides essential information in allowing prospective participants to make informed decisions regarding participation.

Questions can be referred to Tod Schimelpfenig, Safety and Training Director, The National Outdoor Leadership School, 288 Main Street, Lander WY 82520. (307) 332-6973. **

Letter to the Editor



Pain-killers in the Wilderness

The following is a an excerpt from a letter responding to Buck Tilton's Article "Drugs in the Wilderness" which appeared in the May/June issue of the WMN.

As regards aspirin and ibuprofen: both are NSAIDs, a class that includes aspirin, ibuprofen, and prescription-only drugs such as naproxen (Naprosyn, Anaprox), and Indomethacin (Indocin). These drugs are used to treat inflammation from problems such as rheumatoid arthritis. There is a common conception that most wilderness injuries have a component of inflammation, and that therefore an anti-inflammatory medicine (an NSAID) is best for pain from such injuries. However, studies of such minor injuries show that NSAIDs do little or nothing to speed recovery from such injuries, or to reduce the inflammation and swelling from such traumatic injuries. Therefore, the goal is simply to control pain. For this, aspirin and acetaminophen are about the same, and ibuprofen is better.

In thinking about wilderness injuries that might truly need an anti-inflammatory effect, the only one that comes to mind is tendinitis. It comes in many forms: wrist, ankle, arm . . . A common type is "mal do raquette," so-named by French explorers of North America who found that wearing snowshoes ("raquettes") caused inflammation of the Achilles' tendon at the heel;. Unlike acetaminophen, both aspirin and ibuprofen are NSAIDs. However, to get their anti-inflammatory effect, one would have to take 16 to 20 325 mg aspirin tablets a day, or about 12 200 mg ibuprofen tablets a day. In the dosage for pain (aspirin, two 325 mg tablets, or ibuprofen, two 200 mg tablets, both every four hours as needed), neither one has a significant anti-inflammatory effect. Taking larger doses than this does nothing for pain.

Which NSAID should one carry in a wilderness medical kit, aspirin or ibuprofen, or a prescription NSAID? They all do pretty much the same thing and have pretty much the same side effects (though the drug companies will argue this to no end). The only prescription NSAID I might consider carrying is piroxicam (Feldane); it has somewhat faster onset of action than aspirin or ibuprofen, and only has to be taken once a day. It's easy to forget to take pills when in the wilderness, so once-a-day dosing is ideal. This also means that you have to carry fewer pills. However, if you ask me if I carry piroxicam in my own wilderness kit, the answer is no. I carry ibuprofen because it is cheaper, available over-the-counter, and most lay people know what it is and know the dosage, unlike prescription NSAIDs such as piroxicam. I also carry aspirin as well as acetaminophen, because some prefer to take aspirin for headache and other minor pains. (Tylenol? I'd rather have two aspirin if you have them.)

One fact about pain medications, surprising to most: Most studies, with few exceptions, show that 400 mg doses of ibuprofen (the standard over-the-counter dose) is better for pain than 30 or 60 mg of codeine (e.g., one or two tylenol #3).

Does it help pain to take acetaminophen with hydrocodone (or codeine) in addition to ibuprofen? One study found no benefit. However, two studies found that it did afford better pain relief. Answer: Possibly.

Sincerely yours,
Keith Conover, M.D.

(Editor's note: In his letter, Dr. Conover referred to 23 specific studies. If you are interested in this topic, send a stamped SAE and we will forward his list of references.) **

WMN Dispatches

Wild Med Teaching Slides Available

The Wilderness Medical Society has developed a series of lecture slides to help you teach wilderness medicine. Each set contains between 70 and 140 slides and a booklet of explanatory text, written by a knowledgeable member of the Society. The information presented is factual and informative. Though prepared for physicians and medical students, you should find the slide presentations useful for instructing prehospital personnel, outdoor educators, and other wilderness users.

Currently-available presentations include:

1. "Diarrhea from Wilderness and Foreign Travel" - the general principles of enteric infections with a close look at traveler's diarrhea and giardiasis.

2. "Field Water Disinfection" - the etiology and epidemiology of waterborne illnesses and water disinfection method that assure safe water.

3. "High Altitude Medicine" - the effects of altitude with a look at acclimatization and recognition and treatment of AMS, HAPE, and HACE. Included are the effects of altitude on pre-existing conditions.

4. "Hazardous Marine Life" - the general principles of first aid for marine injuries, the bacteriology of the aquatic environment and its implications for treatment, with principle of antivenin treatment.

5. "Accidental Hypothermia" - the physiology of thermoregulation with prehospital and hospital management principles and an in-depth look at rewarming methods and methods of prevention.

6. "Wilderness Dermatology" - the problems caused by ultraviolet light from the sun, and problems from the toxicodenrons (e.g. poison ivy). Treatment and prevention are discussed.

The WMS plans future releases of "Heat Illness", "Diving Medicine", and "Wilderness Management of Orthopaedic Injuries". For more information, contact: The Wilderness Medical Society, P.O. Box 2463, Indianapolis, IN 46206-2463

Hepatitis Hotline

The AIDS epidemic continues to obscure our vision about another serious blood-borne pathogen. In the June 1992 edition of Emergency, Camela Stuby reports that Hepatitis B is the "second-most common reportable sexually transmitted disease in the United States." It kills 14 people a day and infects 300,000 each year.

SmithKline Beecham, makers of the first genetically-engineered hepatitis B vaccine now offer a toll-free hep B information hotline. To reach them, call (800) HEP-B-873.

Orthostatic Vital Signs

Sometimes we use orthostatic (concerning a standing or straight-up position) vital sign changes as an assessment tool in wilderness (or any prehospital) medicine. The idea is this: When a patient is in the early stages of hypovolemic shock, and they rise from a supine to a sitting position with legs hanging down, their pulse will increase and their blood pressure will drop. New evidence suggests that these changes may not be quite as reliable as once thought.

200 healthy adults, before and after donating 450 ml of blood (or approximately 7% to 8% of an average adult's blood volume), had their orthostatic vitals checked. The test group showed an average increase in pulse of two beats per minute, and an average drop in systolic BP of three mmHg. There were no relevant differences caused by age.

For this amount of blood loss, the changes were not statistically significant. Testers concluded: "None of the various orthostatic vital sign changes were very sensitive in detecting a blood loss of 450 ml."

Baraf, L.J., and Schriger, D.L. "Orthostatic vital signs: variations with age, specificity and sensitivity in detecting a 450 ml blood loss.: American Journal of Emergency Medicine. 10:99-103, 1992.

INSARTA

The International Search and Rescue Trade Association (INSARTA) was formed because some folks with vision saw a need, not only in the U.S. but on an international scale, to establish a forum for the sharing of contemporary search and rescue information, training opportunities, new ideas and products, and news of "who is doing what." The aim of INSARTA is to broker information and provide a communication link between the people directly involved in providing search and

rescue in the field (from wilderness/rural areas to urban catastrophic disaster response) and the many businesses and manufacturers that have products or services of interest and benefit to the search and rescue community.

The initial major product of INSARTA is a quarterly newsletter. As INSARTA grows, the intention is to produce resource directories, training manuals, technical papers, symposia, and trade shows. Subscribers will receive large discounts on all future products and services.

The newsletter will serve as the forum for the sharing of new ideas on everything from equipment to techniques , to new research and technology that has immediate application for use by the search and rescue responder. It will also provide the interested business and manufacturers insight and information to help them develop or improve the products search and rescue personnel require in order to do a more effective job.

For more information contact: David Rider, General Manager, INSARTA, 4537 Foxhall Drive NE, Olympia, Washington 98506. (206) 352-5613.

Seldane Danger

Seldane, the most-prescribed antihistamine in the United States and a very common drug in wilderness first aid kits, can cause cardiac irregularities and death in certain predisposed users. Problems occur, sometimes, when levels of Seldane build up in the blood from excessive use. There are two especially susceptible patients: Those who take more than the recommended two tablets (120 mg) per day, and those who take the drug with certain other drugs.

Two drugs that should not be used with Seldane are ketoconazole (the generis name of Nizoral, an antifungal medication) and erythromycin, a common antibiotic. Food and Drug Administration Commissioner David Kessler said in a recent statement: "Use of Seldane together with ketoconazole and erythromycin must be avoided." The FDA further stated that patients suffering with liver disease should also avoid use of Seldane. The warning extends to Seldane D, which has a decongestant added.

Since its introduction in 1985 Seldane has risen rapidly to the top of antihistamine sales, due largely to the fact that it is non-sedating--no drowsiness, no dry mouth. It doesn't cross the blood-brain barrier and, therefore, does not effect central nervous system function. If you have been using Seldane without any side-effects, the FDA says it is safe to keep using it at the dose prescribed for you. Don't, however, start using another drug along with Seldane unless you consult your physician first. And don't take more than the recommended dose. Larger doses won't increase Seldane's effectiveness, anyway.

OSHA Guideline Update

The lead article of the WMN last January (Vol. III, No. 1) concerned new OSHA guidelines which, among other things, required employers to offer hepatitis B vaccinations to all employees who have an occupational exposure to blood or other potentially infectious materials (OPIM). We reported that this could be construed to apply to outdoor leaders and had that suspicion confirmed by conversations with OSHA officials at the state and national levels. Since the publication of that article, a text addition to the OSHA regulations (effective 7/1/92) has eased the burden on outdoor programs. The text addition reads as follows:

"...as a matter of policy violations will be considered *de minimis* and citations will not be issued when designated first aid providers who have occupational exposure are not offered pre-exposure hepatitis B vaccine if . . . The primary job assignment of such designated first aid providers is not the rendering of first aid."

(OSHA Instruction CPL 2-2.44C, Enforcement Procedures for the Occupational Exposure to Bloodborne Pathogens Standard, 29 CFR 1910.1030)

Important note: This does **not** exempt outdoor programs from following the OSHA post-exposure protocols for unvaccinated first aid providers.

Conferences and Course Notices

Wilderness Medical Society

The Wilderness Medical Society is sponsoring three conferences in 1993:

Ski CME

January 27-29, 1993 at the Resort at Squaw Creek

16 hours CME anticipated. $485 conference registration includes two nights accommodations, continental breakfasts, and use of all resort facilities.

Key Largo Conference and Cruise

Conference to be held April 15-17, 1993 at Key Largo, Florida. 18 hours A-1 CME - Cost: $250.00

Cruise on April 18-24 from the Bahamas. 12 hour A-1 CME anticipated. Cost to be announced.

Teton Wilderness Trek and Conference

Trek is June 20-22 1993 in the Teton Wilderness. 8 hours CME - Cost: variable

General Conference is June 23-25, 1993 at the Jackson Lake Lodge. 20 hours A-1 CME. Cost to be announced.

For more information contact: OWMS, 131 First Street, Suite G, Benicia, California 94510, (707) 745-3785.

Herbal Training Program

The Rocky Mountain Center for Botanical Studies announces a year-long Herbal Training Program. Students study herbalism from well-respected and nationally-known herbalists in Boulder Colorado. Classes begin in February 1993. For more information or to receive a catalog, write to: The Rocky Mountain Center for Botanical Medicine, 1705 14th Street, #287, Boulder, Colorado 80302. You may also call (303) 442-2215.

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Earth Treks Sponsors Russian/American Climbing Exchange

Earth Treks, a Maryland-based adventure education organization, is sponsoring a mountaineering expedition to the former Soviet Union for both Russian and American climbers. With the support of the Russian government, a two-phased climbers' exchange has been planned for 1993.

The first expedition is to the Andes Mountains of Ecuador and is scheduled from January 16 to 31, 1993. The team of climbers will be ascending four mountains ranging from 16,818 to 20,703 feet.

The second expedition is to the peak of the Pamirs of Tadzikastan, a remote corner of the former Soviet Union. This expedition is being organized in part as an exchange for doctors and others interested in studying high altitude physiology. The expeditions will be led by Chris Warner, a successful Himalayan climber and mountaineering guide.

Applications for participation on these expeditions are currently being taken.

In addition to these hard core expeditions, Earth Treks offers introductory, intermediate, and advanced climbing and mountaineering courses, guided bicycle tours, and "off the beaten path" cultural explorations. Guided by Bob Charles and Chris Warner, Earth Treks has long been recognized as a leader in the field of adventure education. With over 26 years of experience, Mr. Charles and Mr. Warner have fused the best qualities of the outdoor education field and the adventure travel industry to create an organization famed for the quality of its services, guides, and itineraries. Their expertise has attracted such clients as Outward Bound, the University of Virginia, and the Adventure Sports Institute.

For more information on the Earth Treks Russian/American Climbing exchange and all of Earth Treks instructional programs and vacation packages, you can contact their Clarksburg, Maryland office at (301) 972-5468.

The Wilderness Medicine Newsletter, Inc.

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ISSN 1059-6518

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Production Editor: Carolyn J.C. Thompson, M.Ed.

The *Wilderness Medicine Newsletter* is published six times a year: January/February, March/April, May/June, July/August, September/October, November/December. Subscription rates are: $20 for a year, $37 for two years. Back issues are available upon request.

Correspondence should be sent to: *Wilderness Medicine Newsletter*, P.O. Box 9, Pitkin, Colorado 81241. Questions and comments are welcomed.

The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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P.O. Box 9
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Telephone: (303) 641-3572
Answering Service: (303) 641-4766

Some of WMI's 1993 Offerings:

Wilderness EMT

- May 17 - June 11 in Pitkin, Colorado. $1,295.00.
- August 2 - 27 in Pitkin, Colorado. $1,295.00.
- November 22 - December 16 in Kelly, Wyoming. $1,350.00.

Wilderness First Responder

- February 1 - 12 in Santa Fe, New Mexico. Tuition only: $350.00. Tuition, Room and Board: $750.00.
- February 27 - March 7 in McCall Idaho. Tuition only: $350.00. Tuition, Room and Board: $525.00.
- March 26 - April 6 in Santa Cruz, California. Tuition only: $425.00 plus camping.
- March 26 - April 6 in Monticello, Utah. Tuition only: $400.00. Tuition, Room and Board: $600.00.

Solo Seminars

Advanced Leadership & Emergency Care (ALEC)

February 1 to March 5, 1992 (w/EMT Certification Module) 160+ hours -- $1,325 to $1,550

Outdoor leaders need a balance of wilderness medicine and leadership skills along with prevention, survival, and rescue training. Our month-long ALEC program not only fulfills the DOT First Responder, SOLO First Responder, and National Ski Patrol's Winter Emergency Care curriculums, but also goes beyond both First Responder and EMT objectives with a week-long environmental emergencies segment and several sections on medical problems traditionally not addressed in either standard or wilderness pre-hospital courses. The leadership component of ALEC is based on the needs assessments and evaluations of thousands of trip leaders with whom we have had contact over these past 16 years. Field work is a major component of the program. ALEC is appropriate for anyone planning to be or already involved in leading outdoor trips - whether day hikes or month-long expeditions.

Residential courses include lodging, meals, all instructional materials, textbooks, and examination and certification fees. Costs may vary for courses at sites other than SOLO. For more information, contact: SOLO, RFD 1, Box 163, Tasker Hill, Conway, New Hampshire 03818. Or call: (603) 447-6711.

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

November/December 1992 Volume 3, Number 6

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Deep Wounds in the Deep Wilderness

By Buck Tilton

"I'll empty all these veins, and shed my dear blood drop by drop."

- William Shakespeare

There are times, of course, when you would prefer to keep those veins full. Which reminds me...there are three basic guidelines for treating deep, open wounds in the wilderness:

1) stop blood loss
2) prevent infection, and
3) promote healing.

In this issue we'll concentrate on 2 and 3, we'll consider deep wilderness as a place long hours from a doctor, and we'll think of a deep wound as one that will require closure.

Wound Cleansing

Just because you're out in wild country doesn't mean you're safe from exposure to infectious agents (such as hepatitis B and HIV) when you deal with open wounds.

(continued on page 2)

" . . . Deep Wound Care"

(continued from page 1)

You may be using fluids under pressure and sharp objects, both of which increase your risk of infection. Take the time to put on protective gloves and, maybe, a pair of glasses before you start cleaning a wound.

Your choice of wound cleaning solutions may be limited, but, if you have prepared before your trip, you will probably get the best results from povidone iodine solution. Unlike povidone iodine scrub, the solution contains no detergent, and it is effective against bacteria, viruses and fungi. Another well-tested and proven cleaning solution is the non-detergent Polaxamer 188 (sold as Shur Clens [R]). Its major shortcoming is its lack of anti-bacterial activity. If you end up without either one of these, use the cleanest water available. Water safe to drink is safe to clean wounds with.

The single most effective method of reducing bacterial count on wound surfaces, and removing debris and contaminants, is wound irrigation. For optimal results, use an 18 gauge needle or plastic catheter and a 35cc syringe. Hold the needle one to two inches from the wound. Too far away reduces the force of the stream. Your ability to improvise is only limited by your imagination...you may melt a pinhole in the top of your Nalgene bottle or punch a pinhole in a plastic bag to create an irrigation system. The amount of fluid forced through the wound can vary. Keep irrigating until the wound looks as clean as possible.

Although wound soaking has been long practiced as a cleaning method, there is no evidence to support its use. It is recommended only when ground-in dirt and debris litter the wound's periphery. Shaving off the hair around an open wound is another time-honored practice that should be avoided. Hair around a wound can be easily cleaned with normal washing techniques, and shaving often produces micro-tears in the skin, another source of infection.

"The single most effective method of reducing bacterial count on wound surfaces, and removing debris and contaminants, is wound irrigation."

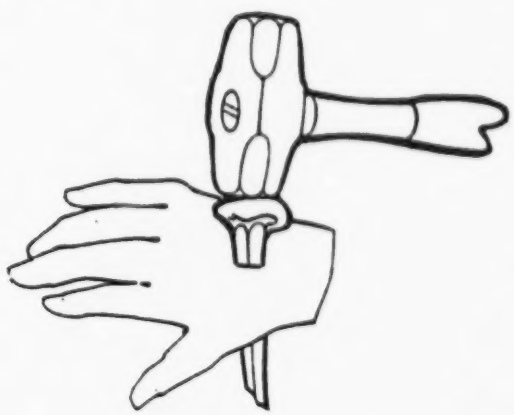
Wound Closure

When considering how a wound should be closed, consider first the mechanism of injury. There are three general mechanisms for deep lacerations:

1) Sharp objects, such as knives, produce a simple division of tissue resulting in a **shearing injury** that is relatively simple to deal with by pulling the wound's edges together.

2) Blunter objects, striking the skin at an angle of less than 90 degrees, often produce a partial avulsion, a **tension injury**, requiring more careful closure of the irregular division of tissue.

3) Blunt objects, striking the skin at a right angle, produce a **crushing injury**, with very irregular borders, lots of devitalized tissue, and many problems for the person trying to close the wound.



Oops! Now what?

Another wound deserving a few words is a deep **puncture**, including animal bites. With the high potential for infection these wounds carry, aggressive irrigation, and possible debridement, are indicated.

There are three categories of wound closure:

1) **Primary** closure is performed on clean wounds with fairly regular borders. These wounds are most often the result of shearing injuries. Closure can wait for 24 hours on the face, and up to 12 hours on other body parts. In the field these wounds can be closed with closure strips, staples, or sutures. Strips work best if you first lay down a line of tincture of benzoin along both sides of the wound, being careful to keep the benzoin out of the

wound. The stickiness of benzoin makes the strips stay in place much better. Start strips on both sides of the wound, using them as handles to pull the wound closed. Skin staplers need to be cocked, which pushes the sharp staple ends partially out of the stapler. Placing one staple end in the skin on one side of the wound, pull the wound closed and place the other staple end in the skin on the other side of the wound. And staple! After strips or staples, run a bead of antibiotic ointment along the closed wound and dress with sterile gauze or, better yet, a micro-thin dressing, such as Tegaderm[R]. In general, staples and sutures produce identical scars, but staples should not be used on the face, hands and feet. (Note: deep wounds to the face, scalp, hands and feet, should be evaluated as soon as possible by a physician to ensure minimum scarring and, because of their unique anatomical structure, maximum healing.) For suturing instructions (not generally recommended for the untrained), refer to Dr. William Forgey's Wilderness Medicine (ICS Books, Inc., 1370 East 86th Place, Merrillville, IN 46410). Field suturing materials are available from Indiana Camp Supply, 125 East 37th Street, Loveland, CO 80539.

2) **Secondary** closure should be considered for deep punctures, deep animal bites, ulcerated wounds and abscess cavities. They are usually best managed by careful cleaning but no strips, sutures or staples. Stated very simply, secondary closure is closure by allowing the wound to heal on its own.

3) **Tertiary** closure is delayed closure. These wounds are cleaned, dressed, and observed for 4 to 5 days before mechanical closure. This type of wound would be very contaminated, probably with dirt or saliva, but it would not be associated with significant tissue loss.

Wound Healing

The tensile strength of a deep wound actually decreases during the first week to 10 days after closure. There is a high risk of wound separation during this period and during a long transport from the wilderness be gentle and consider splinting the closed wound. Final tensile strength will not be reached for several months after closure.

All wounds undergo some contraction during healing. This natural contraction produces a depressed and ugiier scar. The effect can be lessened somewhat if the edges of the wound are slightly everted, pushed upvard, when they are pulled together. This process is not always as easy as it sounds.

Closure Issues

1. **Foreign bodies** lodged in soft tissue may be a source of complications. They fall into two classifications: inert and non-inert. Inert materials include metals and other compounds that do not cause a tissue reaction. Inert materials do not have to be removed from a deep wound. In fact, doctors sometimes leave them in place permanently, where they encyst and lay harmlessly for the rest of the patient's life. Wood, thorns and other non-inert materials must be removed from a deep wound. They can cause a variety of bacterial and fungal infections. Glass fragments are generally inert but sometimes cause a tissue reaction. Wounds in which glass fragments may be embedded should be seen by a physician as soon as possible.

"Inert materials do not have to be removed from a deep wound. In fact, sometimes they are just left in permanently where they encyst and lay harmlessly for the rest of the patient's life."

2. **Debridement** is the removal of visible contaminants and devitalized tissue, which will prevent healing. Devitalized tissue can be recognized by its shredded, ischemic, blue or black appearance. With tissue scissors or scalpel (or a very sharp knife) this tissue should be carefully cut away. The overriding principle for debridement is, as Dr. Alexander Trott, author of Wounds and Lacerations: Emergency Care and Closure, writes: "...spare as much tissue as possible immediately after the injury." If in doubt about tissue, leave it alone.

3. **Antibiotics**. If you're carrying antibiotics appropriate for deep wounds, should you use them? There are no clear cut answers but, generally, start antibiotics for 1) heavily contaminated wounds, 2) crushing injuries, especially if they're noticeably contaminated, 3) wounds that involve cartilage, joint spaces, tendons or bones, 4) mammalian bites, including human bites, and 5) wounds that are 12 to 24 hours old when you see them. First generation cephalosporins (i.e. Keflex) are a reasonable choice for prophylaxis. Patients allergic to penicillin may react to cephalosporins. Erythromycin can be used for those patients.

4. **Evacuation**. For maximum benefit to the patient, deep wounds closed in the wilderness should be evacuated at the earliest and safest convenience of the party for a physicians's evaluation. **

A Burning Issue: Burn Care In The Wilderness

By Buck Tilton

For years we have sought definitive guidelines for dealing with burns in remote settings. We are most happy to be able to present these recommendations, based on a presentation by Jeffrey Saffle, M.D., Director, Intermountain Burn Center, Salt Lake City, Utah, the 8th Annual Meeting of the Wilderness Medical Society, September 1992.

Burns are among the most painful and emotionally distressing of injuries. Even relatively minor burns may disrupt the wilderness experience of an individual, or an expedition.

Some aspects of burn treatment depend on your assessment of the **depth** and **extent** of the injury. Even though this assessment may be rough, it will be your basis for deciding how the patient will be managed, whether evacuation is required, and how urgently.

Depth

First degree burns affect only the epidermis and are characterized by bright red skin, the absence of blisters, and mild to moderate pain. These injuries, which include sunburn, should heal spontaneously within three to five days and will not result in scarring.

Second degree burns extend down into the dermis itself and are characterized by red to pale skin; large, fluid-filled blisters; and sever pain. These burns should heal spontaneously in one to three weeks and may result in moderate scarring.

Third degree burns have obviously penetrated all layers of skin and may destroy vasculature, muscle tissue, and bone. They are characterized by pale or charred skin and flesh, dry blisters, and dull pain. Because healing mechanisms themselves may be destroyed, healing will be very slow or may never occur, and scarring is severe.

Extent

Use the Rule of Nine's (which is printed in virtually all first aid texts) or, for smaller areas, the Rule of Palmer Surface (the patient's palmer surface equals about one percent of their total body surface). Some specific treatments for various sizes of burns are noted in the article. Generally speaking, the following guidelines are applicable.

In first degree burns (e.g. sunburn), an injury that covers 50% to 60% of the body could lead to serious dehydration. Start oral fluid rehydration immediately, have the patient rest, and monitor vital signs.

Second degree burns place patients in a danger zone when they cover 15% or more of the skin surface. Consider immediate evacuation.

Theoretically, any third degree burn places a patient at risk of severe infection. Consider immediate evacuation when 3% to 5% of the skin surface is burned.

Initial Care

1. **Stop the Burning Process.** The faster the better...within 30 seconds, if possible. Burns can continue to injure tissue for a surprisingly long time. As an example, just imagine how long a steak continues to sizzle after it is removed from the grill. No first aid will be effective until the burning process has stopped. Smother flames, if appropriate, and cool with water. Do not try to remove tar or melted plastic.

2. **Manage the ABC's.**

3. **Assess for Associated Injuries** (i.e. fractures, lacerations).

4. **Evaluate the Burn.**

5. **General Treatment for the Patient:**
   - Keep the patient warm. When skin is lost, so is the patient's ability to thermoregulate. Hypothermia increases the potential for life-threatening shock.
   - Elevate injured parts.
   - Get the patient to drink as much fluid as he or she will tolerate, unless the burn is very large (a second or third degree burn over greater than 15% of the body). Nausea and vomiting are very common during the first 24 to 48 hours after an injury.
   - Remember: an unconscious patient is unconscious from something other than the burn.

6. **General Treatment for the Burn:**

Caring for the wound itself is often the least important aspect of burn care. All burn wounds are sterile for the first 24 to 48 hours. Burn management is aimed primarily at keeping the wound clean and reducing the pain.

- Gently wash the burn with slightly warm water and mild soap. Pat dry. Remove the skin from blisters that have popped open (but do not open blisters). Wipe away serum and obvious dirt.
- Dress the burn with a thin layer of antibiotic ointment. ("I don't encourage Silvadene Cream," says Dr. Saffle. "Bacitracin will work as good.")
- Wrap the burn with a thin layer of gauze, or apply clean, dry clothing. Burns on the face, neck and hands may be left open to the air. Covering wounds reduces pain and evaporative losses, but do not use an occlusive dressing.
- When evacuation is imminent, do not re-dress or re-examine the injury. But if evacuation is distant, re-dress twice a day by removing old dressings, re-washing, and putting on clean dry covering. (Note: you may have to soak off old dressings with clean tepid water.)
- **DO NOT PACK WOUNDS OR PATIENTS IN ICE!** And do not leave wet packs on burns for very long.
- Elevate burned extremities to minimize swelling. Swelling retards healing and encourages infection. Get the patient, as much as possible, to gently and regularly move burned areas as soon as possible after the injury, and continue until healing is complete.
- Ibuprofen is probably the best over-the-counter painkiller for burn pain (including sunburn).
- If you have no ointment, no dressings, and/or no skill, leave the burn alone. The burn's surface will dry into a scab-like covering which provides a significant amount of protection.

Special Burn Care

1. Any burn covering more than 10% of the patient's body should, when available, have **IV fluid resuscitation** started as soon as possible. Dr. Saffle recommends the Parkland formula: (4ml Lactated Ringers) x (kg body weight) x (% of body burned) = 24 hours requirement. Normal saline can be used, but no dextrose. When supplies are limited, use what you have over the first 12 hours.

2. Circumferential burns may swell until they become a tourniquet. This will develop within 24 hours of initial injury. The treatment is an **escharotomy**, a longitudinal incision through the constricting eschar. An escharotomy produces a major wound, and should not be attempted unless you are trained and equipped. Circumferential burns should be considered for a rapid evacuation.

3. Burn medications: Antibiotics, generally, should be avoided during the first 24 hours. Tetanus prophylaxis should be sought, if needed. Anti-inflammatories (aspirin, ibuprofen) may be given. For the relief of pain it is most important to keep the wound covered. Because of the increased chance of stomach irritation and nausea. Narcotics and other oral analgesics (including aspirin and ibuprofen) should be used sparingly, especially during the first 24 hours. **

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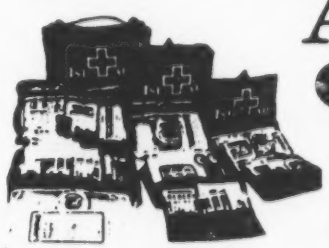

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American Indian Medicine: A Sampler

By Ken Thompson

In 1990 there appeared a paperback edition of American Indian Medicine by Virgil J. Vogel (Norman, Oklahoma: University of Oklahoma Press). First published in 1970, the book received generally favorable reviews, and was adopted by the then flourishing drug culture as something of a minor cult classic. The current interest in things Native American and the fact that the current medicine employs a bare minimum of 32 substances derived from drugs first used medicinally by pre-Columbian North and South Americans, makes this book worthy of a closer look. I'll give you that peek here, and encourage you to find a copy yourself for further enlightenment (it contains a staggering bibliography). I've selected some of the more interesting points to highlight, and must add the standard caution that we expressly advise against using any of this in your first aid care. However, a most appropriate use is to dazzle your companions with your profound knowledge of Indian lore.

Emetics

A sizeable portion of Native American medicine was devoted to expelling poisons and disease-causing foreigners from the body. This practice led to the development of a wide variety of emetics (things that make you vomit) and cathartics (things that make you have a bowel movement). The Brazilian rain forest gives us one substance that does both and, to this day, is an important emergency drug. Ipecac is derived from the bark of Cephaelis ipecacuanha and was first used by a European when William Piso learned of its use against amebic dysentery in the early 17th century. South America has given us another of today's important drugs, quinine, which is used now as it was then, principally as an antimalarial. Quinine is made from the cinchona tree, the bark of which has been used for generations as a febrifuge, or fever-fighting medication. Some say that the North American dogwood bark has similar properties, as does wild cherry.

Commonly Found Medicine

Corn, or maize, was not only a common food crop of the Americas but was used as a major source of medication as well. It served as a cure-all for the urinary tract, having been used for kidney stones, blood in the urine, and bladder infections. Corn silk tea, by some reports, is an excellent diuretic.

Another well known diuretic among Native Americans, one that is still prescribed by doctors today, is cranberry (Vaccinium oxycoccus L.). Another form of cranberry, the high-bush cranberry (Viburnum opulus L.), was also used as a diuretic but found other uses as well. Also known as "cramp bark," tea brewed from the high-bush cranberry was used to treat pain all over the body and was listed as a sedative and antispasmodic in the National Formulary as late as 1960.

The hemlock tree was used in medicine by most northern tribes. Here are just a few of the many uses Vogel catalogs in his text: The Potawatomis brewed a tea from the leaves to induce perspiration to break up colds; the Flambeau Ojibwas used the bark to heal cuts and to stop the flow of blood from wounds; and the Menominees used the leaves in their sweat lodge and the inner bark for a tea taken for colds and pains in the abdomen.

The May apple (Podophyllum peltatum L.), which is found widely throughout the United States was valued by the Cherokees for its many uses. The fruit of the plant was thought to be wholesome but the roots are another matter. Used as a powerful emetic and cathartic in small doses, the root was thought to be the source of a poison used to commit suicide.

The bark of the Salix species of willow was well known as a pain killer by Native Americans. Its roots, and those of other willows, were used widely as a fever reducer because of their perspiration-inducing properties. Salicin, the active ingredient in the trees, was the forerunner of modern day analgesics, such as aspirin and other synthetic substitutes.

Among other North American trees, white oak (Quercus alba L.) was probably the most widely used among numerous tribes. According to Vogel's research, the following is but a small list of recorded uses of the tree:

White Oak bark was an Iroquois astringent. The Penobscots recognized the same property, steeping the bark and drinking it for bleeding piles. They also ate the acorns to induce thirst, believing it beneficial to drink plenty of water. Houma Indians crushed the roots and mixed them with whiskey for a liniment to rub on

rheumatic parts. The Ojibwas scraped the root bark and inner bark and boiled it for a decoction used internally for diarrhea. The Meskwakis boiled the inner bark and drank the tea to cause expulsion of phlegm from the lungs and when the chest was bound up. The Menominees used an infusion of the bark for an enema to relieve piles. (p. 343)

Enemas

Speaking of enemas, it's worth noting that although enemas enjoyed ancient use throughout the Old World, New World inhabitants had developed it completely independently. In fact, central Amazon tribes were the first to use rubber bladders on their devices. In other parts of the New World, bladders were of the pre-made variety, sometimes taken from turtles, but most often from mammals, including the deer and jaguar. Syringes were commonly made from the hollowed leg bones of large birds, or from rushes and reeds. They were used for everything from the treatment of constipation, diarrhea, and hemorrhoids to the "administration of wine by the Aztecs and the narcotic parica by South American tribes." Depictions of the process may be found on ancient Peruvian pottery.

Surgery

Another invasive medical procedure practiced by Native Americans was the use of sutures to close wounds. The Ojibwas reportedly repaired torn ears by cutting the torn parts off evenly with a knife and sewing them back together with a needle and deer sinew. Other suture material included human hair and the fibers of plants, most notably basswood. It was in South America that an amazing forerunner of modern day surgical staples was developed, "by allowing leaf cutting ants to pinch the edges of a wound together, then twisting their heads off." Other treatments included the cauterization of wounds with special types of wood and the creation of drains from wicks of twisted cloth or bark fibers.

It was also likely that Native Americans understood something about asepsis before it was known in the Old World. It was reported by numerous early observers that various tribes irrigated wounds with quantities of warm water into which certain drugs had been dissolved.

Clearly, though, no ancient medical intervention can compare with the surgery now referred to as trephination:

The most spectacular surgery performed in pre-Columbian America was trephination (skull surgery), of which the most abundant evidence has been found in Peru, though trephined skulls have been found in several parts of the United States and Canada. Dr. Brooks believed that in the operation Indians of the Andes employed several anesthetic drugs, including cocaine and peyote. Adams believed that the operation was performed in accordance with the surgical principle of fracture decompression, though perhaps with a view to releasing evil spirits. The reasons for trephination by primitive people have been suggested as (1) to permit the entry or projection of something into the body of the patient, (2) to permit the escape of, or to take from the body, something, or (3) to combat sorcery. (p. 193).

Fractures, Sprains, and Dislocations

It is in this category of injuries that Native American treatments are given the very highest marks. Being an active lot, they seemed to have had a good deal of experience at reducing and setting disruptions to the bones and joints. Most tribes understood basic principles of fracture reduction and splinting, using such materials as cedar and the flat ribs of giant cacti. Other, more sophisticated, techniques included the use of form fitting splints in the form of wet clay or rawhide.

In the early seventies I watched high school trainers use a technique, first employed by Mescalero Apaches, who "rubbed dislocated parts until warm and then with a quick jerk forced the bone into place, rubbing medicine on afterward to allay the pain, and finally tied with a bandage." (p. 215) There are also stories of the self-reduction of dislocated joints. According to an observer named Zeisberger: "If an Indian has dislocated his foot or knee, when hunting alone, he creeps to the next tree and tying one end of his strap to it, fastens the other to the dislocated limb and, lying on his back, continued to pull until it is reduced." (p. 215)

Conclusion

You have just read of some of the highlights of Native American medicine. It was not all good. A great deal was based on false reasoning, folk wisdom, and pseudo-science. Much of it, in fact, ranged in effect from utterly useless to positively dangerous. Nevertheless, we have learned from aspects of their practices. For example, we have a better understanding of the value of ritual, conviction, and faith in the healing process--although today we might call these things psychotherapeutic benefits. But perhaps most significantly, we now possess many wondrous drugs derived from substances Native Americans came to understand through countless generations of trial and error. They acquired valuable data, data we could not replicate today, on the effect plants have on human subjects. Bearing this in mind, I offer the following thought:

(continued on page 8)

"American Indian Medicine . . ."

(continued from page 7)

As scientists we cannot afford the luxury of an ethnocentric snobbery which assumes a priori that primitive cultures have nothing whatsoever to contribute to civilization. Our civilization is in fact a compendium of such borrowings, and it is a demonstrable error to believe that contacts of "higher" and "lower" cultures show benefits flowing exclusively in one direction. Indeed, a good case could probably be made that in the long run it is the "higher" culture which benefits the more through being enriched, while the "lower" culture not uncommonly disappears entirely as a result of the contact.

("Folk Medicine and Folk Science," Journal of American Folk-Lore, Vol. LV, October-December, 1942, pp. 199-200.)

Weston La Barre made that statement 50 years ago in reference to the contributions South American Indians had made to Western medicine. Given that the 500th anniversary celebration of Columbus' "discovery" of this land is in full swing, La Barre's comment seems particularly poignant, yet today. **

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- July 26 to August 20: SOLO

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Residential courses include lodging, meals, all instructional materials, textbooks, and examination and certification fees. *Costs may vary for courses at sites other than SOLO. For more information, contact: SOLO, RFD 1, Box 163, Tasker Hill, Conway, New Hampshire 03818. Or call: (603) 447-6711.

WMN Dispatches

New Anti-Cold Chocolate Bar

Before fats can be burned to produce energy (and heat) they must be converted into fatty acids, and carbohydrates must be available for the conversion to take place. Up at the University of Alberta in Edmonton, where winter sits long and heavy, a professor, Dr. Lawrence Wang, discovered that adenosine, a compound present in all cells, but especially muscle cells, blocks the conversion of fats to fatty acids. So he developed a new food bar to help the body overcome the cold.

The Canadian Cold Buster works in two ways: it provides lots of quick-energy carbos so you can sustain metabolic activity under cold conditions, and it contains substances that block the sites where adenosine hinders fat conversion.

The bar is made from familiar food ingredients, is low in fat (8.6%), and is 63% complex carbohydrates. The amount of each ingredient, says Dr. Wang, is the key to why the bar works.

Canadian Cold Busters are currently not available in the United States, but patents have been applied for. More info is available from: Canadian Cold Buster, P.O. Box 60164, University of Alberta Postal Outlet, Edmonton, Alberta, Canada T6G 2S5.

AABRE 1993

The 1993 American Andean Biomedical Research Expedition will take place in Ecuador in May of 1993. This expedition will study acute mountain sickness and includes mountain climbs and a jungle expedition after five days of research. The cost is $2000.00 from Miami, Florida. Anyone interested should contact William Bernhard, M.D., at 228 East Churchill Street, Baltimore, Maryland 21230, or Research Coordinator Lisa Miller Schallick, R.N., at (410) 328-2628.

Heimlich Goes Public: His Maneuver First For Drownings

"No study was ever done that proves mouth-to-mouth increases survival of drowning persons," says Dr. Heimlich. "Yet for 30 years the American Red Cross has been teaching mouth-to-mouth, which is the cause of unnecessary drowning deaths."

Water in the airway, claims Dr. Heimlich prevents air from getting into the lungs. His maneuver, an abdominal thrust I'm sure you're familiar with, should be performed immediately on drowned persons, Heimlich continues, in order to clear the airway. Then initiate CPR, if needed.

ARC spokesman, Lawrence Newell, EdD, counters: "Doing the Heimlich maneuver first is not advised because of the high likelihood that the patient will vomit and aspirate the vomit because the airway is unprotected."

Heimlich countered Newell's counter by pointing out that 86% of all drowning victims who receive CPR vomit anyway (The Medical Journal of Australia, 1988).

Who is right? Who knows? But, for the record, Heimlich argued against backblows for choking for years before they were removed from Red Cross training, and he argues today against the finger sweep, claiming it will drive the offending object deeper into the airway.

New Hepatitis A Vaccine: Taking The Pain Out of International Travel

Drug manufacturers Merck, Sharp and Dohme have applied to the Food and Drug Administration for approval to market a new vaccine that has proved 100% effective in producing the appropriate antibody response against hepatitis A. First reported at the 1991 meeting of the American Society of Tropical Medicine and Hygiene, the drug is well-tolerated and has no serious side effects.

The new hepatitis A vaccine should make international travel safer...and less painful. You may remember getting a gamma globulin injection in the past, which provided partial protection against the disease. It hurt and it lasted a few months. The new shot promises to be relatively pain free, and protection may last up to seven years. Careful eating and drinking habits will still be important when traveling in countries where hepatitis A abounds.

Wilderness Medicine

Bookshelf

The Basic Essentials of Avalanche Safety

by Buck Tilton
ICS Books, Inc.
Merrillville, IN
68 pages. $5.99

The mission of the Basic Essentials series, to provide the essential knowledge needed to experience a safe, enjoyable trip into the wilderness, continues with the addition of **Avalanche Safety**. Buck, Director of the Wilderness Medicine Institute and a certified Avalanche Hazard Evaluator, has honed the vast amount of information on snow avalanches to a sharp cutting edge of usable info for the experienced and the novice snow country traveler. Short, very readable chapters cover the topics of interpreting snow, weather and terrain, evaluation of the hazard, choosing a safe route, rescuing and caring for an avalanche victim, and the gear required for maximum safety in avalanche-prone areas. If you travel where the snowy torrents may run, this book is highly recommended.

BEOAS can be ordered from the WMI office at:

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The $7 price includes postage.

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Wilderness EMT

May 17 to June 11 in Pitkin, Colorado
- Cost: $1,295.00

August 2 to 27 in Pitkin, Colorado
- Cost: $1,295.00

November 22 to December 16 in Kelly, Wyoming
- Cost: $1,350.00

Wilderness First Responder

February 1 to 12 in Santa Fe, New Mexico
- Tuition only: $350.00
- Tuition, Room and Board: $750.00

February 27 to March 7 in McCall Idaho
- Tuition only: $350.00
- Tuition, Room and Board: $525.00

March 26 to April 6 in Santa Cruz, California
- Tuition only: $425.00 plus camping.

March 26 to April 6 in Monticello, Utah
- Tuition only: $400.00
- Tuition, Room and Board: $600.00

More On Pain in the Wilderness

The following information about managing pain in wilderness settings is provided by WMN subscriber Keith Conover, M.D.

Let me say something about the quality of pain. There is mild pain, moderate pain, severe pain. Taking two aspirin will help mild pain. But taking thousands of aspirin will do nothing for severe pain. (Well, you'd die from salicylate poisoning, but that's not the point.) For moderate or severe pain, you need medicines that work by a different mechanism than acetaminophen (e.g., Tylenol(R)) or aspirin. Almost all of these stronger medications are NSAIDs (NonSteroidal Anti-Inflammatory Drugs) or narcotics. (Taken in large doses, aspirin is a NSAID, but it does not have pain-relieving properties as strong as the other NSAIDs such as ibuprofen.)

Common medical teaching is that aspirin is harder on the stomach than other NSAIDs. This seems to be confirmed by a few studies. A recent survey of NSAIDs among regular users (people with true inflammatory problems) however, found that aspirin had the fewest side effects.

Someone is bound to mention that aspirin has an anti-platelet effect, acting as a mild blood thinner, and that acetaminophen and ibuprofen don't really share this property. That's true (well, ibuprofen has a slight anti-platelet effect) but the main use of anti-platelet doses of aspirin (one baby aspirin a day) is to prevent stroke and myocardial infarction (heart attack). I don't see how this anti-platelet effect of aspirin is going to be helpful in the wilderness unless you happen to run across someone with unstable angina, a rare occurrence in the wilderness.

The anti-platelet effect of aspirin might be a reason to use acetaminophen or ibuprofen instead. For instance, after a head injury, your primary worry should be about bleeding into the brain. It would be best not to give such a person aspirin for the headache. Acetaminophen would be the first choice, with your second choice either being a narcotic or an NSAID other than aspirin. NSAIDs other than aspirin have a slight anti-platelet effect, but the best evidence is that it is so small as to be nearly insignificant.

One final note on NSAIDs: ketorolac (Toradol(R)). This is a prescription-only NSAID. In oral form it's really no better than ibuprofen. It has only been available in the U.S. for a year or so, but is now being used in massive amounts in Emergency Departments. Why? Because, if given by intramuscular injection, it's as potent as morphine or Demerol(R). I've replaced about half of the morphine in my medical kit with ketorolac. There

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The Wilderness Medicine Newsletter, Inc.

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ISSN 1059-6518

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Production Editor: Carolyn J.C. Thompson, M.Ed.

The *Wilderness Medicine Newsletter* is published six times a year: January/February, March/April, May/June, July/August, September/October, November/December. Subscription rates are: $20 for a year, $37 for two years. Back issues are available upon request.

Correspondence should be sent to: *Wilderness Medicine Newsletter*, P.O. Box 9, Pitkin, Colorado 81241. Questions and comments are welcomed.

The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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"Pain . . ."

(continued from page 11)

are still times when I want to use morphine, but ketorolac has replaced it for most uses.

Ketorolac causes minimal, if any, sedation, and thus is ideal if, for example, someone with a fractured arm could walk out with assistance if only the pain could be controlled. Most people who take narcotics for such pain will be confused and clumsy and might get hurt trying to walk out. If injected with ketorolac, however, they should be alert enough to travel.

As far as narcotic drugs, the article lists three: oxycodone (e.g., Percocet), hydrocodone (Vicodin), Anexsia, and codeine (e.g., Tylenol#3). All three share the primary narcotic effects: analgesia (pain relief), sedation, constipation, and suppression of cough. Oxycodone is considered a very potent narcotic, and hydrocodone and codeine less so. Oxycodone use is thought to put people at high risk of addiction, so it is a more highly restricted narcotic ("Schedule II") than hydrocodone or codeine ("Schedule III"). Acetaminophen with codeine (e.g., Tylenol#3) is more well-known than acetaminophen with hydrocodone (e.g., Vicodin, Anexsia). One study showed that hydrocodone caused fewer side effects such as sedation. This same study showed that hydrocodone probably has a better pain-relieving effect. Another study showed acetaminophen with codeine to be only slightly better than plain acetaminophen. Thus hydrocodone (e.g., Vicodin(R)) is my choice for a wilderness medical kit oral narcotic.

This is confirmed by an observation of emergency physicians: those who come into the Emergency Department with a fabricated story about pain, looking for drugs, are "allergic" to codeine: they all want "Percs" (oxycodone), or failing that, hydrocodone. This may say something about the euphoric effect of the drug, but I think it also speaks to the lack of unpleasant side effects.

Is there, then, any logical reason to take prescription narcotics such as codeine or hydrocodone if you already carry ibuprofen? Yes. You can give the codeine or hydrocodone to suppress cough, to control diarrhea, or as a sleeping pill. You can give acetaminophen with either of these narcotics safely to someone with peptic ulcer disease (ulcers), and they may not cause as much stomach upset as ibuprofen (though both codeine and hydrocodone are known to sometimes cause nausea if taken on an empty stomach). I do carry acetaminophen with hydrocodone in my medical kits. **

To All of You, a Safe and Joyous New Year!

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